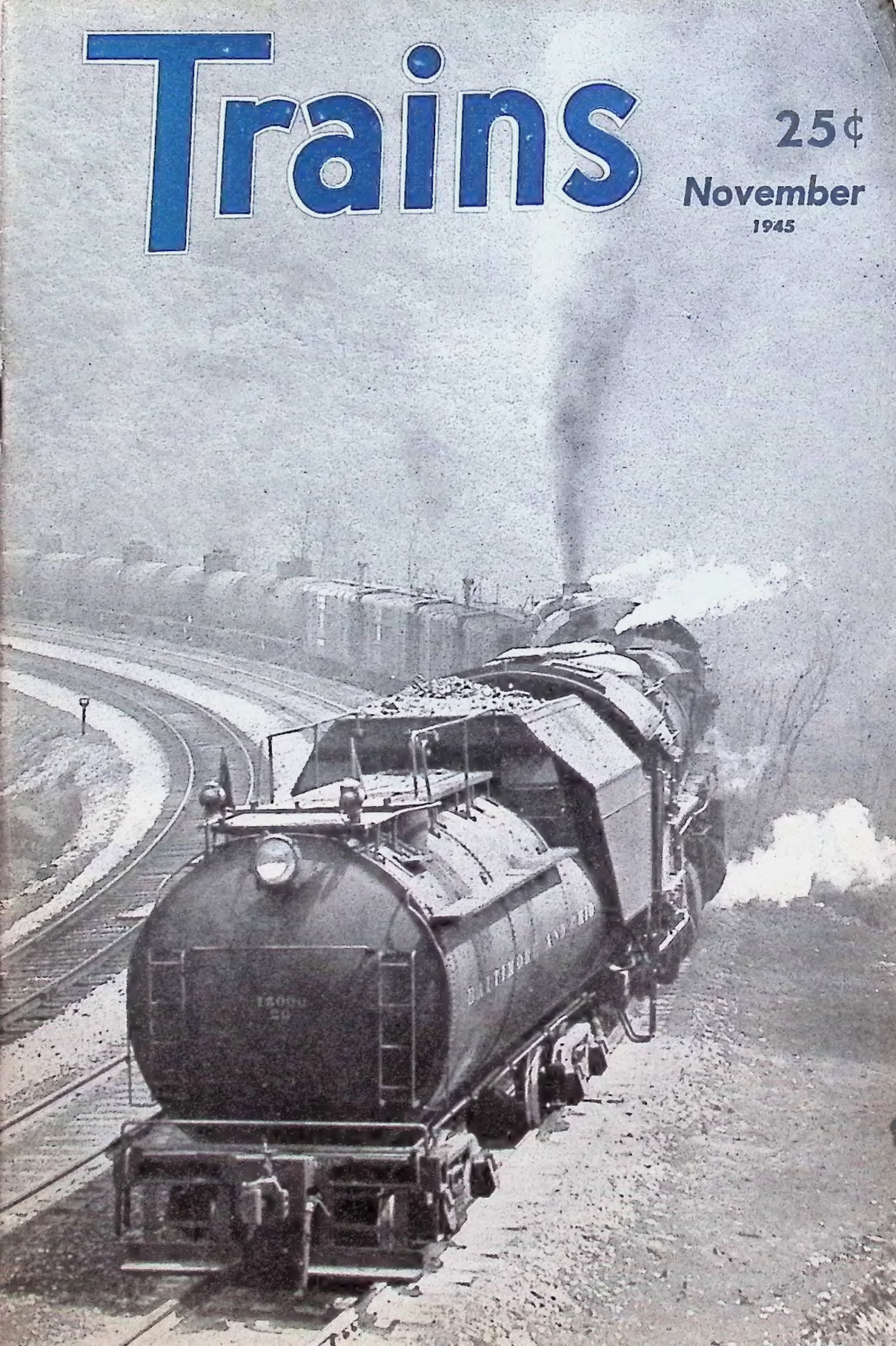
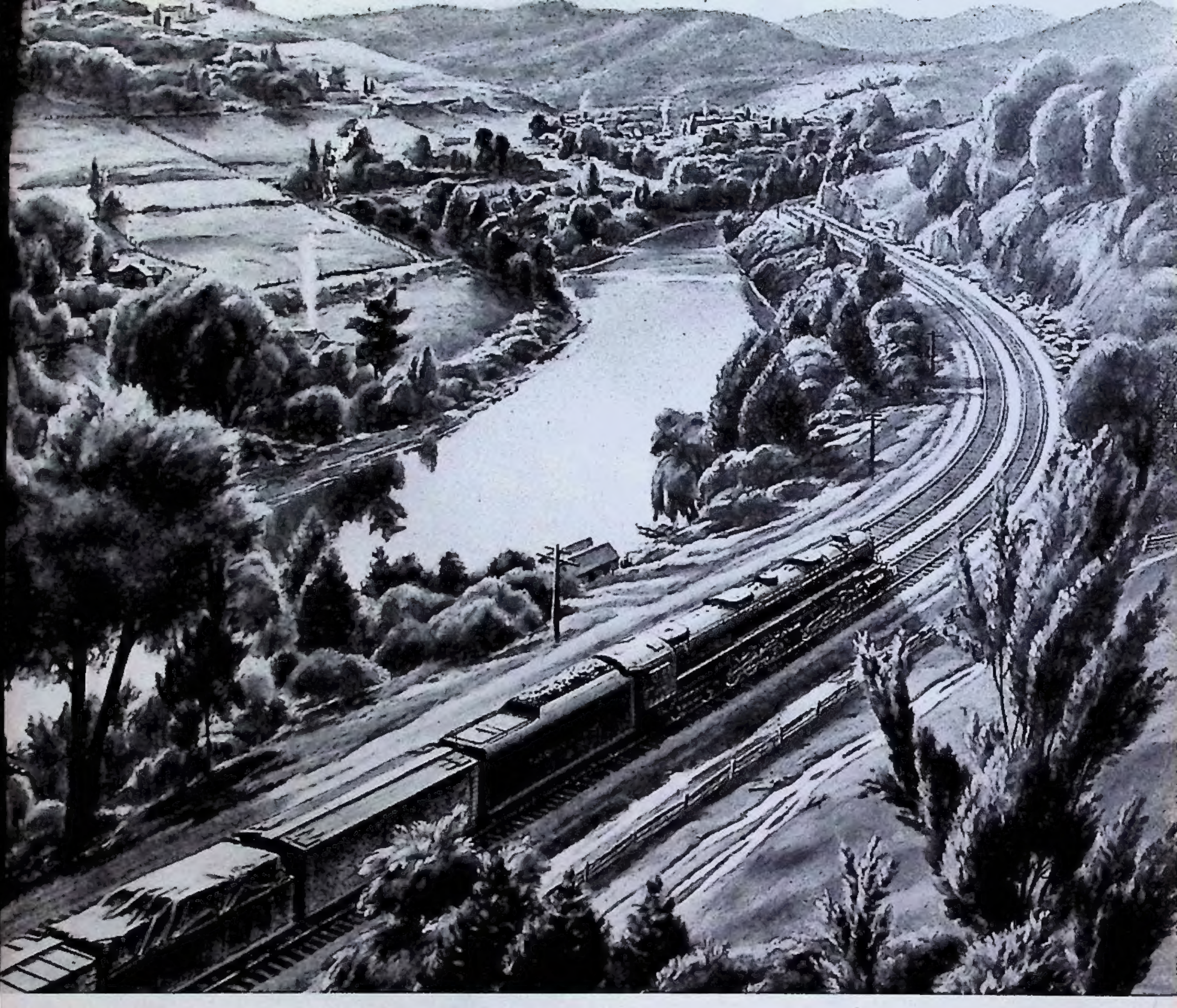
Trains

25¢

November

1945





Making molehills out of mountains

ALONG the Delaware and Hudson railroad are a number of steep grades. A few years ago, you might have seen as many as three locomotives pulling one train over the hills.

It wasn't because locomotives couldn't be built powerful enough to take the grades all by themselves. They could. But they were too wasteful of power on the level stretches.

Today—thanks to an important development—you'll see these jobs being done by single locomotives. For locomotives now coming out of the American Locomotive Company shops provide plenty of power for heavy pulls *plus economy and speed on level runs.*

Stemming from this same development are locomotives that can be used interchangeably between passenger and freight trains. These advantages help reduce the number of locomotives a railroad needs in order to do its job. And that's important to you. For the more money a railroad saves, the more money it has to improve its service.

The principles underlying this development can be applied to diesel-electric or steam locomotives—or any modification of either type. It doesn't matter whether a locomotive burns coal or oil—*economy of performance* is American Locomotive's chief concern.

This is just one of many developments that will contribute to finer postwar railroading. And it is significant that it comes from the Company that designed America's first diesel-electric locomotive, built the world's largest steam locomotive and has supplied an important share of the locomotives used by the United Nations.

The Paths of Peace

One of the Main Roads back to Peacetime Prosperity is America's mighty System of Railways, which gave their best to hasten Victory and through the years will transport the nation's commerce with ever-greater Efficiency.

Important among the roads that stand ready to play essential parts in the vast transportation job ahead is **THE MINNEAPOLIS & ST. LOUIS RAILWAY**

Pictured above is a train of mixed freight, rolling over the fertile prairies of the Great Midwest on the M. & St. L. main line, in Fast Daily Service between Minneapolis and Peoria. At the head-end is one of the Railway's new 4,050 horsepower Giant Diesel Locomotives.

This modern motive power is typical of the new equipment that the M. & St. L. is adding constantly to its locomotive and car fleets, to insure Fast Freight Service via

THE TIME-SAVING PEORIA GATEWAY

THE MINNEAPOLIS & ST. LOUIS RAILWAY CO. — THE PEORIA GATEWAY

The MINNEAPOLIS & ST. LOUIS Railway

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GENERAL OFFICES, NORTHWESTERN BANK BUILDING, MINNEAPOLIS 2, MINN.

Railroad Wages: Our Opinion

The wage increase demand of the railroad brotherhoods, although it was presented just before the end of the war and so was ahead of the rest, is now only one item in the broad movement toward a higher wage level, and hence a higher price level, for most of U.S. industry. The demand on the railroads is for sufficient extra wages to more than wipe out the entire railroad profit for record year 1944, and it was presented just as the roads faced their greatest competitive battle, which can be won only by immense capital expenditures for improvements.

Basic demand is for an increase in wages of 25 per cent or $2.50 per day, whichever is greater. But on top of this are piled some 45 demands for changes in working rules which would amount to an additional increase sufficient to nearly double the operating payroll.

The wage demands were apparently stimulated by both a widespread misimpression among labor that the railroads got rich out of the war and by the ease with which railroads are selling refunding bond issues at low rates of interest. However, the railroads are by no means getting rich and have never even in plush years reached the six per cent return on investment which the Transportation Act of 1920 set up as adequate. The bonds which are sold so easily now are not a means of new financing, but a replacement of old financing so as to reduce the load of fixed charges which caused so many roads to go into bankruptcy in the past. The only type of improvement which can be financed by borrowing is equipment, and many of the necessary postwar improvements will be to road and structures.

Money for these improvements must come either from profits or from sale of stock. Stockholders, unlike bond holders, put their money permanently into the company and share the risk of proprietorship, hoping to get a return by dividends paid out of profits. But the standing of railroad stocks on the market, determined by earnings, has not been such that railroads can finance improvements by selling stock. A ruinous wage increase would completely kill any railroad hopes of new capital.

Such profits as the railroads have been able to accumulate during the war will be largely needed for deferred maintenance. The roads were not allowed to accumulate, before taxes, funds to cover normal expenses which could not be taken care of at the time due to manpower and material shortages.

So the wage increases, if forced upon the roads, will be a stomach punch at the worst possible time. Railroad labor will be hurt most, for labor stands to gain most from a continuance of recent railroad policy of investing a large share of earnings in improvements which make railroad transportation still more economical and efficient.

The corner stone of American industrial success has been a combination of good wages with high productivity and low prices. The most economical railroad transportation in the world (except for low-wage Japan) has contributed in no small measure to this industrial efficiency. This economy of transportation is possible only because of the billions of dollars invested by the railroads in improved plant. In fact this investment may be said to have made possible the winning of the war. And at the same time American railroad operating men have not been poorly paid. With two wage increases since the beginning of the war railroad passenger engineers last year averaged $4939, local freight engineers averaged $5423, and the poorest paid operating men, yard firemen, averaged $2735.

It will be very short sighted for the men to sacrifice the future efficiency of railroad transport and the number of railroad jobs by insisting upon their wage demands, and it will be very short sighted of government to encourage the granting of the brotherhood demands for higher wages at this time.

The result of the higher wages will be either no profit and hence an end to capital improvements, or higher rates in an endeavor to keep on a profitable basis. Higher rates will mean more marginal traffic lost to competition, and hence less jobs instead of more. It will mean chopping off light traffic trains instead of adding trains and reducing passenger fares as the roads had been planning.

Actually if this wage move and others being pressed at the present time go through labor will be right where it was before wage increases, for corresponding price advances in all lines will then be necessary. The only losers will be holders of U.S. War Bonds, savings accounts, life insurance policies, and other fixed value investments. Curiously enough, most of these people are workers, and so the chief losers from a general wage advance will be the very people who are pressing such a wage raise!

Perhaps the solution to the particular wage problems of the railroads lies in a complete revision of the wage basis, in the adoption of some kind of incentive plan with higher base rates, but less make work rules. The present dual basis of pay, mileage and time, together with the hundreds of special rules in the contracts, has grown over the years and the present demands for many new "equalizing" rules suggests it might be best to start over from scratch. Or perhaps the solution lies in a profit sharing agreement such as the Jersey Central last month proposed to its employees.

Trains

A. C. Kalmbach — Editor and Publisher
Linn H. Westcott — Editorial Director
J. C. O'Hearn — Research Editor
Naome Bauer — Desk Editor
Julia Bursch — Art Editor

H. H. Kirtland — Business Manager
R. J. Fakler — Plant Superintendent

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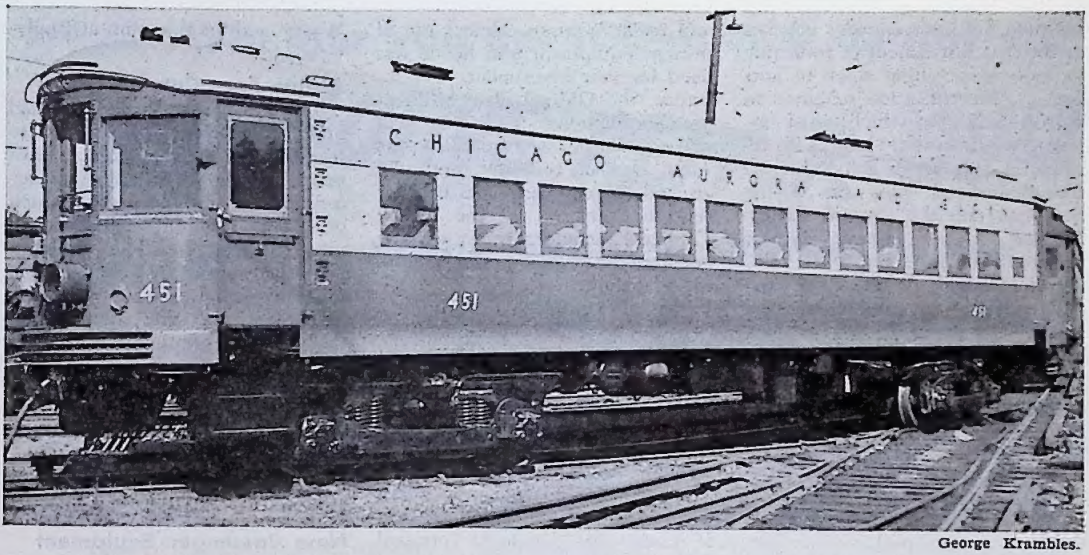

George Krambles.

One of 10 new Chicago, Aurora & Elgin multiple unit cars on delivery and before application of third rail shoes.

The Month's Railroad News in Brief

The Pennsylvania Railroad is operating a road Diesel in test service on the *Red Arrow* between Harrisburg and Detroit. . . The war demonstrated so strongly the necessity of good railroad transportation in Australia that the Commonwealth government and state governments will pay the cost of unifying Australian gauges to a standard 4 foot 8½ inches. The cost is estimated at 91 million pounds. . . The North Western has refurnished the women's lounge in its Chicago terminal with richly colored fully upholstered furniture, soft lighting, smart decorative effects and venetian blinds. . . The New Haven's old "Yellow Building" in New Haven will be replaced with a modern $1,750,000 eight story office building. The old building has been New Haven headquarters for 51 years.

The Chesapeake & Ohio has installed C.T.C. on 30 miles of single track between Orange and Charlottesville, Va. This line includes Gordonsville, junction of the Piedmont and Washington Subdivisions, and is now controlled from the new tower at the junction . . . Frisco postwar dining car menus will compliment a different city on the system each month. . . The Northern Pacific has placed a limited order for train radio after tests of both front to rear and switching communication with Bendix Radio equipment. NP is one of the first railroads to actually order its own equipment, although a number of roads have made tests using manufacturer testing outfits. . . About $20,000 is invested in railroad equipment for each employee, double the ratio at the end of the first world war.

The Baldwin road Diesel has been sold to the National Railways of Mexico where it will be used as two 2000 horsepower locomotives on the 1226-mile main line between Mexico City and El Paso. . . . B&O has ordered the first railroad installation of very high frequency radio and will use it to speed freight car classification in the New Castle, Pa., yard . . . London & North Eastern is returning its locomotives to the prewar bright green (see *Flying Scotsman* story in last issue) and the first one appeared recently. . . London, Midland & Scottish is

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B&O oil train on Cranberry grade.

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building 800 new corridor coaches as the first installment of returning its passenger rolling stock to normal. . . Electrification schemes on British railroads which were interrupted by war will soon be resumed. . . Only two British named trains survived war, the *Flying Scotsman* and the *Cornish Riviera Limited*. Other famous prewar trains will return soon.

Sirloin steak is back on the daily menu of most dining cars the country over, and with it are roast beef, baked ham, fried chicken and other dishes that have been served only occasionally since rationing began. Easing of points has made this possible. . . . A cable tramway is to be built from Palm Springs to the summit of Mt. San Jacinto in connection with a new California state park. . . . The Canadian National is planning a new station at Windsor, Ont. It will be part of a proposed civic center on the Detroit River, and the total length with grounds will be 550 feet. The building will be 225 feet long, and the express wing will be on the site of the present station.

In addition to the 25 4-8-4 locomotives ordered by NYC at the time the experimental No. 6000 was delivered a few months ago, the road has now ordered a similar locomotive with poppet valves. . . . The Union Pacific, which already has the longest C.T.C. installation controlled from one point, has begun work on 160 miles of C.T.C. between Pocatello and Glenns Ferry, Idaho. The territory includes 125 miles of single and 35 miles of double track. . . . An electric cog railway to the summit of Mount Rainier has been proposed by O. S. Willumsen of Seattle and a set of spirit levels has already been run and monuments established. Cost would be $6 million. The ocean can be seen from Rainier's peak, thus giving the proposed railway a scenic advantage over the similar Swiss lines.

GM&O-Alton Merger

The acquisition of the Alton by the Gulf, Mobile & Ohio is one step nearer reality with the approval by the I.C.C. of an Alton reorganization plan which involves purchase of that road by the GM&O. The I.C.C. commented that equipment ownership of the two roads is such that unification will result in more efficient use of present equipment and hence less need for new investment. For instance, the GM&O plans to completely Dieselize and this will make steam power available to the Alton end of the line, and will also release company coal cars for revenue service on the Alton. Through passenger trains will be operated by Diesel power on the entire system.

The reorganization and unification, the Commission said, will result in a system of railroads extending from the Gulf of Mexico to the Great Lakes and enjoying on a large volume of traffic potential maximum hauls in excess of those enjoyed by either of the two systems as presently operated. Connection will be made at East St. Louis over .8 mile of Terminal Railroad Association trackage.

What a Train of Thought!

Don Ashton, executive assistant of the Burlington, was recently accused of having a one-track mind. Quick as a *Zephyr* he came back with, "Yes, but it's equipped with C.T.C."

Where's the Turbine Loco?

The Pennsylvania Railroad's direct drive steam turbine locomotive has been working regularly on the main line between Chicago and Crestline, O., pulling the *Broadway*, the *Trail Blazer* and other trains of the fleet. Latest reports are that it has been setting a good on time record with, of course, trains much heavier than are assigned to the standard K-4s Pacifics. "Trains of 15 and 16 cars are making the 280-mile run in as much as 13 to 20 minutes faster than schedule behind the turbine locomotive," it was revealed by James M. Symes, vice-president of the Pennsylvania's Western Region.

On one occasion the *Trail Blazer*, with 16 cars, was delayed for 12 minutes waiting for connections before leaving Chicago. The turbine not only made up this 12 minutes but arrived in Crestline eight minutes ahead of time. Schedule for the 280 miles is 299 minutes, with five intermediate stops, including one of five minutes at Fort Wayne. On another run the *Broadway* picked up 19 minutes, although it had 15 cars. Its schedule is 280 minutes, and there is a five minute stop at Fort Wayne and another stop at Englewood.

Airline Fare Cuts

The air lines, which have had many of their planes returned to them by the government, now have more passenger capacity than before the war and are making much of recent fare cuts which bring rates in some cases below railroad first class plus lower berth. The railroads meanwhile haven't new equipment and are still bearing the brunt of getting the soldiers home, so they can't make contemplated postwar fare cuts. No newspaper accounts that we have seen have mentioned railroad coach fares, much below air, and a fair basis of comparison on shorter runs.

New Passenger Equipment

The Pennsylvania has ordered from its Altoona shops 90 new passenger cars to completely re-equip the *Trail Blazer* and the *Jeffersonian*, overnight coach trains between Chicago and New York and St. Louis and New York. The order includes 70 coaches of entirely new design, five double-unit dining cars, five lounge-buffet observation cars and five lounge-baggage cars. The cars will have novel new arrangements for seating, appealing lounge and observation salons, and improved air conditioning. Delivery will begin in 1946.

Frisco is buying three new streamlined trains, to be Diesel powered. Two will be used on the *Meteor* between Tulsa, Oklahoma City and St. Louis. The other, together with a new train being bought by the M-K-T, will go on the *Texas Special*, jointly operated Frisco - Katy train between St. Louis and Texas. Pullman-Standard will build the cars.

Plenty of Horsepower

Burlington's *Fast Mail* No. 15 had plenty of horsepower one morning recently. On the 13-car train was a 4-8-4 steam locomotive and a 5400 horsepower freight Diesel. The 4-8-4 was steaming poorly when the train arrived at Lucas, Ia., and so the freight Diesel was taken off a freight and assigned to No. 15. But the steam locomotive had to be left on to heat the train, and hence the spectacle of 13 cars with nearly 10,000 horsepower.

A. C. Kalmbach.

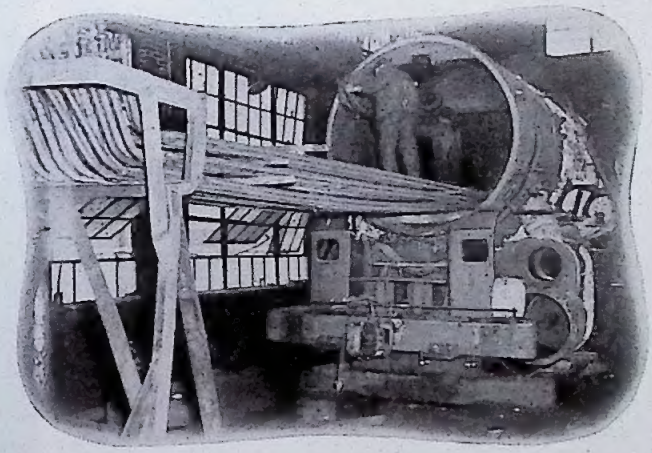
Whether you get 100% or 0 on this

LOCOMOTIVE REPAIR QUIZ

you'll enjoy the booklet offered below!

★

KEEPING locomotives physically fit is a highly important part of Erie Railroad's work. Test *your own* knowledge of locomotive repairs by answering this short quiz. Then send the coupon for your free copy of the fully informative, interestingly written leaflet describing every detail of this service work. In it you'll find the answers to the questions you "weren't so sure of".



★

Choose the one group of words in the parentheses which best completes the statement.

1. The Erie repairmen in the photo, upper right, are (refilling sand boxes) (cleaning steam pipes) (removing boiler tubes.)
2. In the photo, the part of the locomotive which has been removed to expose the interior is called the (dome cap) (smoke box front) (cylinder head).
3. The building in which the operation shown is being performed is the (back shop) (flue shop) (testing house).
4. The locomotive is placed in the engine house by means of a (overhead crane) (thru straight track) (turntable).
5. Boilers should have a hydrostatic test once every (3 years) (1 year) (5 years).
6. Federal law requires that flues must all be removed every (2 years) (6 years) (4 years).
7. When boiler is tested it is pumped to a pressure of (2 times normal) (1¼ times normal) (2½ times normal).
8. Large locomotive parts are usually cleaned (in a lye vat) (by washing cold) (with air pressure).
9. Flues are removed from the boiler by (unscrewing) (power or blow torch cutting).
10. Scale is cleaned from boiler tubes by the use of (carborundum grinders) (wire brushes) (crushed steel).

Match the words in the left-hand column with the proper statement in the right-hand column.

1. Safe end	Removes scale from boiler tubes.
2. Ashpit	Where all parts are removed for classified repairs.
3. Hostler	A short section of tube welded on to provide new material at the firebox end.
4. Running repairs	Minor adjustments made daily.
5. Boiler wash	Detects excessively worn tubes.
6. Classified repairs	Where firebox is cleaned or fires drawn.
	Monthly inspection and repairs.
7. Hydrostatic test	A method of detecting leaks in the boiler.
8. Wheelabrator	Complete overhauling performed at from 80,000 to 200,000 miles of service.
9. Weighing station	Operates the locomotive over the ashpit.
10. Stripping pit	

ERIE

Erie Railroad

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SERVING THE HEART OF INDUSTRIAL AMERICA

R. B. Rogers, Passenger Traffic Mgr., Erie Railroad, Midland Building, Cleveland 15, Ohio.

Please send a copy of this leaflet on locomotive repairs to:

Name.....

Address.....

City.....State.....

Battling

Grades, curves, tonnage and tractive effort, the West End of B&O's Cumberland Division has them all

BY E. L. THOMPSON

There are three tracks on Salt Lick Curve. Continuous sanding of the rails and an avalanche of cinders has left them looking very dirty. The long sweeping 10 degree curve has a water station at the west end, and at the opposite end are the distant signals for Terra Alta, the summit of Cranberry grade. Far below, Salt Lick Creek meanders toward its junction with the Cheat River, 11 miles west. In the distance one hears the constant chugging of locomotives which never seem to get nearer.

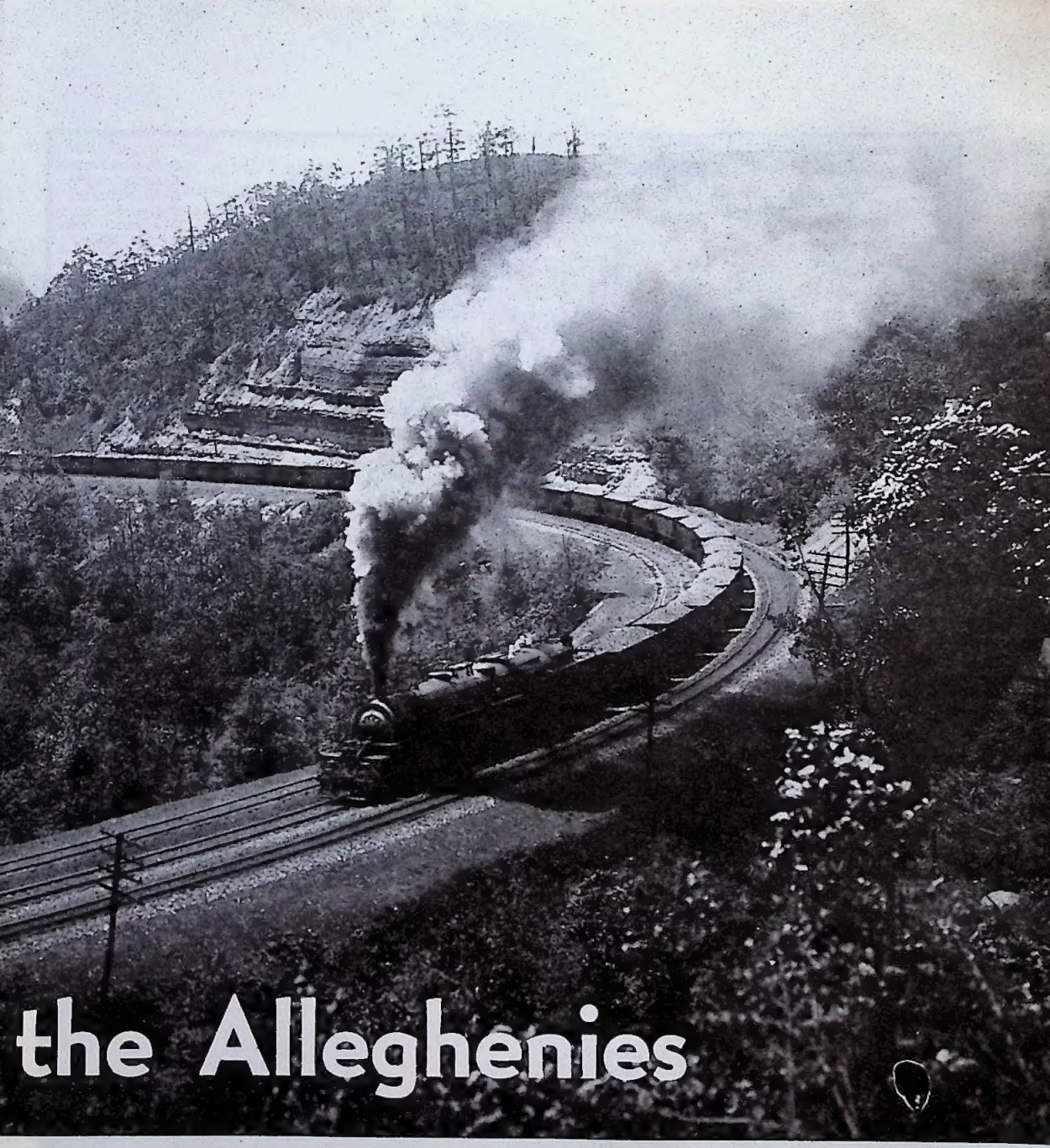
Finally, one of the B&O's new Baldwin EM-1 7600 articulated engines sticks its nose around the bluff and beats a slow, steady exhaust towards the sky as it weaves its way slowly around the curve. Behind it come 4650 tons, represented in 54 loads of coal, and then two of the 7600 class LL-1 Mallets, each sounding as if the next chug would be its last. Even with this tremendous display of motive power, the speed is a mere seven or eight miles per hour. However, the train is not likely to stall, for that is the average gait of coal drags in their regular battles with the Allegheny Mountains.

Several hours later, after crossing the Glades, this same train will drop slowly down Seventeen Mile grade on the eastern slope of the mountains. Runaway safety spurs will serve to keep a check on the engineer's speed during a descent which is even steeper than the climb up Cranberry grade.

This is the West End of the Baltimore & Ohio Railroad's Cumberland Division, extending some 101 miles from Cumberland, Md., to Grafton, W. Va. Featuring four separate grades of two per cent or better, 30 brand-new articulateds, safety spurs, multiple track and 350,000 pounds of tractive effort to lift eastbound tonnage trains over the grades, this line ranks high in appeal to the railfan.

The most famous of the mountain grades is Seventeen Mile, which has long been known as one of the most severe mainline climbs in the country. More than 11 miles of this grade are at an average of 115 feet to the mile, which offer real opposition to the big EM-1 articulateds. Cranberry grade on the other side is nearly as steep, and holds an even more interesting position since tonnage coal trains, which move eastbound, must tackle this climb. Farther west there are the shorter Cheat River and Newburg grades, which incidentally are also of two per cent or better.

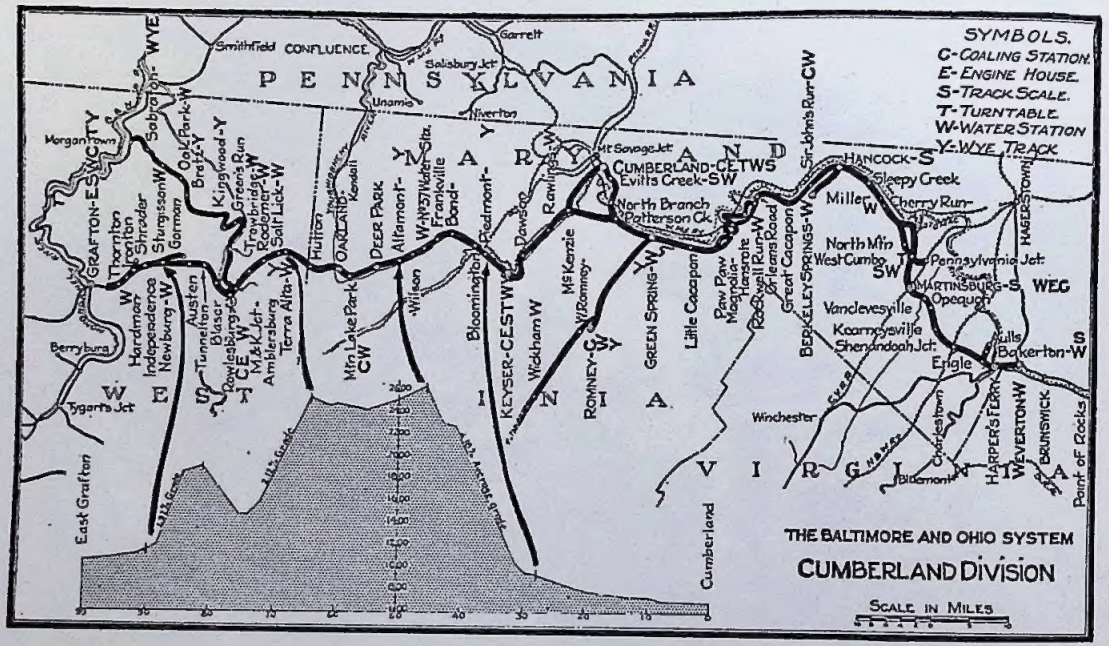
The West End has many other interesting features besides grades and the runaway safety spurs at Bond and Strecker: Western Mary-

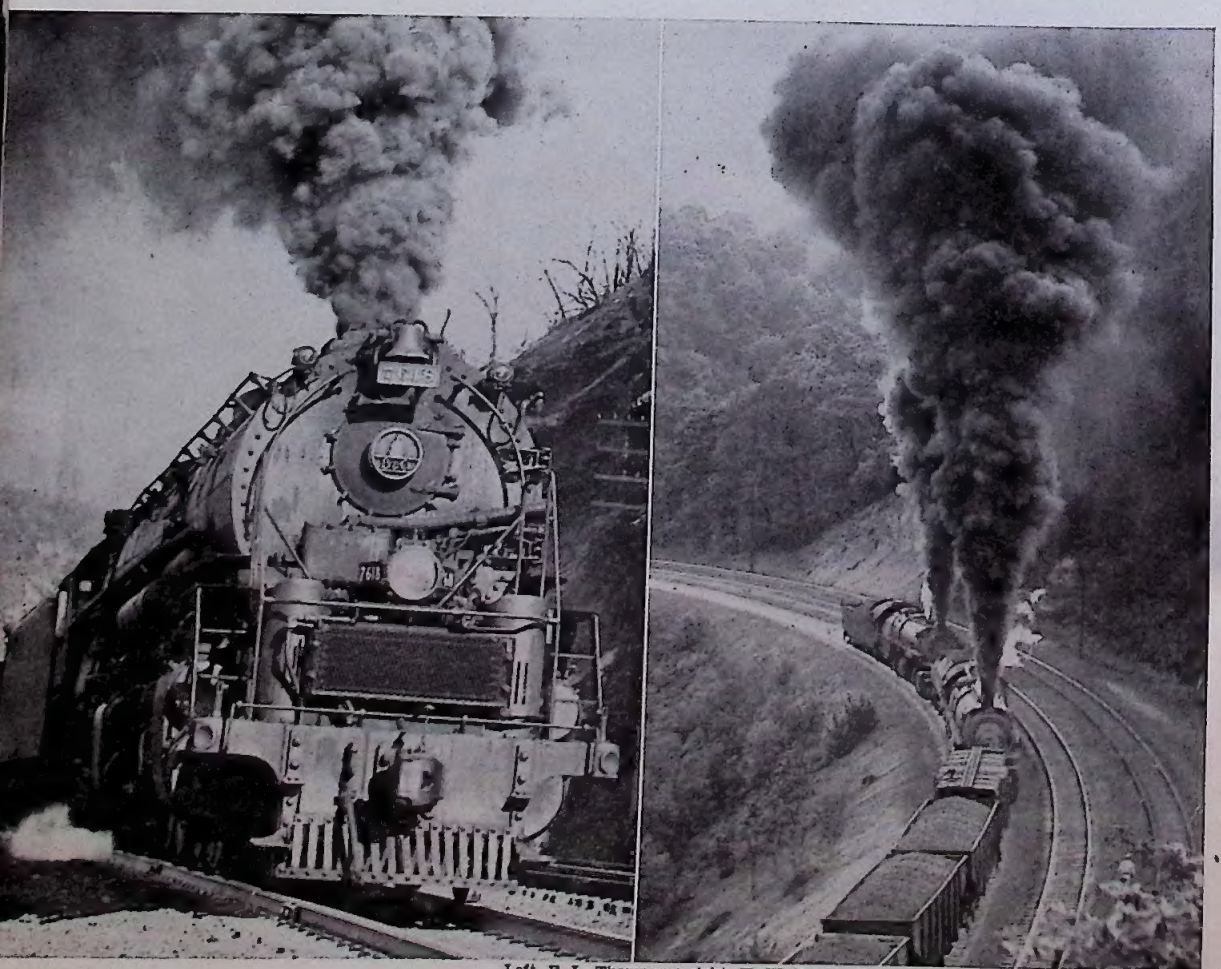


Courtesy B&O Railroad.

Salt Lick Curve

land and Reading leased Consolidation engines for pushers on Seventeen Mile; Tray Run viaduct and Buckhorn retaining wall on Cheat River; the ever fascinating helper station at M&K Junction where most of the 0-8-8-0 Mallets are housed; articulated engines exclusively for road power; small roads interchanging at Piedmont, M&K Junction and Tunnelton; color-position signaling with high speed dwarfs on traffic tracks; middle tracks signaled in both directions; a large classification yard at Keyser; trains dropping down the mountains with retainers up and wheels smoking; important passenger trains blasting their way up the grades with Diesel road engine, a Mikado double heading and a Consolidation pushing; the twin Kingwood tunnels—and many other features, including a present average of about 24 freight trains daily in each direction. In short, the West End of the Cumberland Division is an attractive place for every railfan, regardless of his tastes.





Left, E. L. Thompson; right, H. W. Pontin, Railroad Photographic Club, Boston, Mass.

Because the chief interest on the line is in mountain grades, a brief resume of the profile should be of particular interest. Between Cumberland and Keyser (working westbound) there is a gradual climb from 640 to 815 feet, or 175 feet in 23 miles, about seven feet to the mile. In the next five miles to Piedmont, where the mountain grade actually commences, another 104 feet must be climbed, with a maximum rise of 0.47 per cent. The succeeding 1.8 miles witness an additional 89 feet of climb, with the grade steepening to 1.57 per cent. This brings the line up to the West Virginia-Maryland state line near Bloomington.

Starting at this point, where the Potomac River is crossed and then left for good, Seventeen Mile grade gets under way in earnest. By the time Altamont has been reached, the line is at an elevation of 2628 feet! This represents a climb of 1620 feet in 15 miles, or an average of 108 feet to the mile. But there are places where the climb is as stiff as 2.29 per cent, and by deleting a few stretches near the summit where the grade is somewhat easier, we find that in the 11.2 miles from the state line to Swanton, the climb is 1284 feet, or an average of 115 feet to the mile (2.18 per cent), with *no* allowance for compensation of grade on curves.

A short descent at 0.92 per cent follows to Deer Park Hotel, and then the fall is very gradual through Mountain Lake Park and past Oakland to the Youghiogheny River. A varying grade rises to Terra Alta, with the maximum of 0.99 per cent passing Hopemont. Terra Alta is at the top of Cranberry grade, where from an elevation of 2557 feet the line drops 12 miles to M&K Junction. The main part of the grade, extending to a point just beyond Amblersburg, drops a thousand feet in 8.9 miles, or an average of 112 feet to the mile (2.12 per cent).

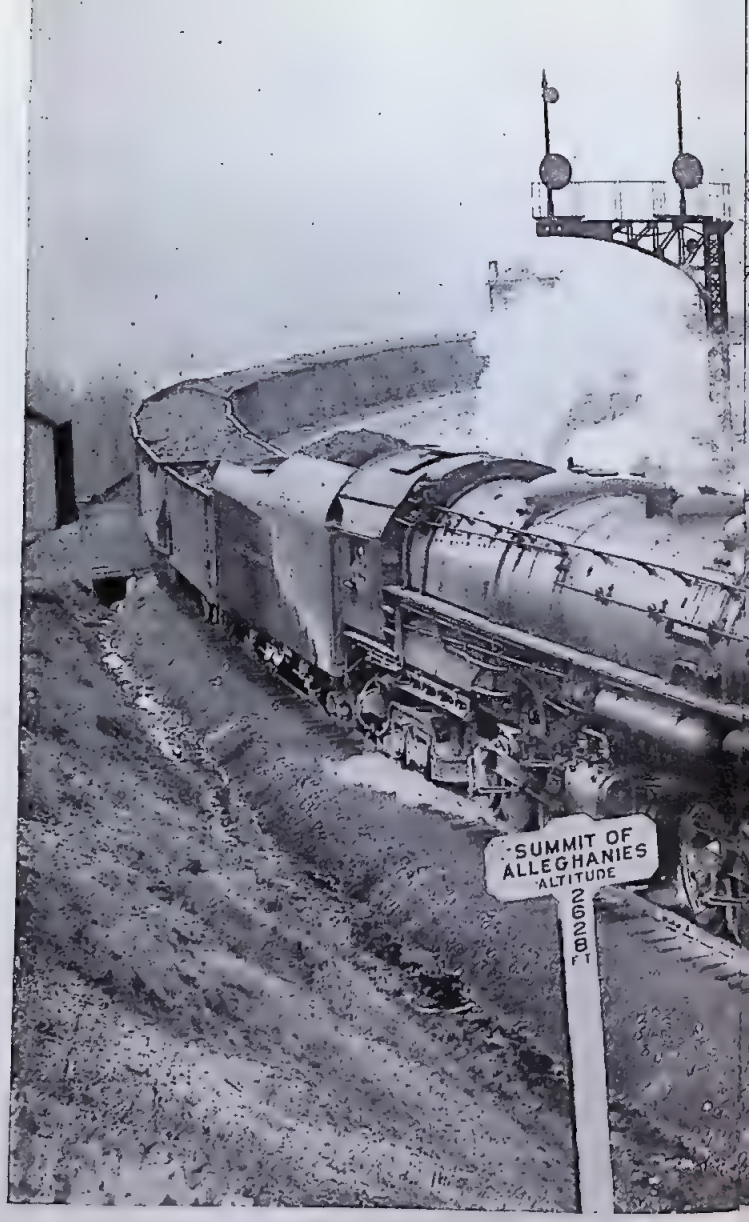
From M&K Junction through Rowlesburg, the descent is gentle, and after reaching a low point of 1402 feet, another 2.0 per cent climb begins, this one lifting the line through the picturesque Cheat River Canyon to Blaser, a 454 foot ascent in something less than five miles.

A mile and one half of 0.43 per cent descent brings the line to Tunnelton, and then come the twin Kingwood tunnels. The westbound track rises to the mouth, then drops at 1.0 per cent to West End tower, whereas the eastbound tracks climb at a steady 0.4 per cent between these points. From an elevation of 1774 feet, the line descends Newburg grade at an average of 1.97 per cent to 1236 feet just before Newburg is reached. The fall is a shade under 1.0 per cent between Newburg and Hardman, and then there is easy running to Grafton, with an additional loss of only 118 feet in the last 10 miles. Grafton is 999 feet above sea level, representing an overall change in elevation of only 359 feet in 101 miles.

Although the map shows the entire Cumberland Division, this story covers only the West End portion extending from Cumberland to Grafton. The shaded profile (exaggerated) shows some of the grades encountered on this part of the line, including the average 2.18 per cent of Seventeen Mile grade. The eastern end of the division is a water level line along the Potomac. Left: No. 7618, one of the proud EM-1 simple articulateds, climbs up Cranberry grade west of Terra Alta. On the rear of this 54-car westbound coal train are two helpers, Nos. 7040 and 7038, seen smoking on Salt Lick curve in an overhead shot taken from Terra Alta shortly before the train stalled. Right: 7618 stalls just above Salt Lick curve on Cranberry grade. After numerous attempts to start the train failed, 10 cars were cut off and returned to Terra Alta. Only 51 minutes had elapsed from the time the train stopped until the rear 44 cars reached Terra Alta.

E. L. Thompson.

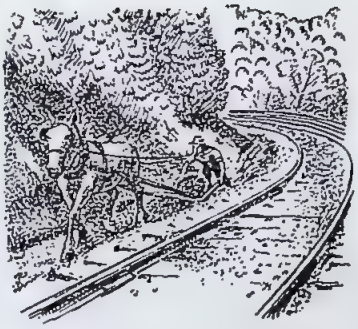
At Bond and Strecker on Seventeen Mile grade are the safety spurs, built 33 years ago to catch runaway trains. These spurs depend upon time release switches. Approaching the tower from the west, downgrade, a train must consume at least 59 seconds on a 1700 foot circuit (starting at the distant signal) to insure the mainline route. The switches are normally lined for the safety spur, and if less time is consumed the towerman cannot throw the switch over to the main line until after an additional two minutes have elapsed. Obviously if the train is out of control and takes less than the required 59 seconds, it is going to take far less than two minutes to run a succeeding similar distance. Frequently an engineer feels he might have run the 1700 feet too quickly, with the result he will bring his train down almost to a walk, to allow for the two minutes to elapse. If the towerman then sees the train is under control, he may line up the main track at the expiration of that time. The safety spur at Bond extends 62 freight car lengths, and that at Strecker 66, both reaching a maximum grade of 12 per cent going up the side of the mountain. Obviously once getting in one of these tracks, it is almost impossible to leave without assistance, for the train is in a real hole. And on top of that, going into the spurs means almost certain demotion from road to yard service unless there is a very good reason. Even should the train use the required time to allow the release to run down, an engineer may ask for the safety spur by sounding one long blast of the engine whistle.



West of Tunnelton is Kingwood Tunnel, where a three track main runs through two bores. The older single track tunnel is used for westbound trains, while the newer bore, double tracked and at slightly lower level, handles traffic in both directions.

Courtesy B&O Railroad.

With a Mikado pushing, 54 cars of eastbound coal cross the summit of the Alleghenies at Altamont, Md., (elevation 2628 feet) and start down Seventeen Mile grade. The spelling of Alleghenies in the sign is a correct though local form.



Cumberland, the Queen City of the Alleghenies, first saw the smoke of the B&O on November 5, 1842. The construction of the railroad up to this point had been relatively easy compared to what was to come. While the road had originally been chartered to connect Baltimore with the Ohio River, there was some doubt as to the route the line would follow west of Cumberland. Various plans were considered, many of which resulted in legal entanglements with state legislatures and the new Pennsylvania Railroad.

It was finally decided to build to Wheeling without touching the state of Pennsylvania, and by 1850 construction of what is now the West End was definitely under way. By June, 1851, the line extended 28 miles to Piedmont, where an enginehouse was constructed. Today locomotives are serviced at Keyser, but for many years Piedmont remained an operating point. The route chosen was generally the line of today. Considerable difficulty was experienced in building over the mountains, and on June 22, 1852, when the first train travelled the line to Fairmont, 22 miles beyond Grafton, Kingwood Tunnel had not yet been finished. Trains crossed the mountains by means of a shoo-fly.

Many interesting problems were met in connection with building the West End, but one of the most interesting was that of the grades. It has been said, and at that time was generally believed, that the practical limit for a steam locomotive was an ascent of 116 feet to the mile (2.2 per cent), and so firmly was this idea entrenched in the minds of railroaders of that time that this figure was set as the maximum grade on the B&O. When in later years Congress began granting charters for the great transcontinental railroads to the Pacific coast, it followed the B&O example, and stipulated in the documents that the maximum grade must not exceed 116 feet to the mile. It is true that today some railroads exceed this figure, par-

Above: E. L. Thompson; below left, H. W. Pontin.

Reading No. 1665, a class 1-9sa 2-8-0, and a B&O Mikado push an 82-car westbound extra past Strecker Tower on Seventeen Mile grade. A third track begins at this point and a safety spur turns up the mountain behind the tower. The spur, which reaches a maximum grade of 12 per cent, will accomodate 66 cars. Left: No. 4445 leaves a heavy oil tanker at Altamont, Md., after a westbound push up Seventeen Mile grade.

ticularly on branch lines (the B&O does for that matter), and the Santa Fe has one main-line grade where it climbs 158 feet to the mile. But these are exceptions rather than the rule, and none of these grades are as long as the B&O's Seventeen Mile grade.

The Cumberland Division of the B&O actually starts at Weverton, Md., 99 miles east of Cumberland. That 99 miles is the East End, one of the most important lines of the system. The West End commences at Cumberland's ancient Queen City Hotel (the station and division offices are in the same building) and proceeds through the city to Viaduct Junction before bearing left. Here the trains for Pittsburgh continue straight ahead and enter the Cumberland Narrows [November 1944 TRAINS]. The North Branch of the Potomac is followed for 28 miles on a river grade double track line.

After leaving Cumberland, the large plants of the Kelly-Springfield Tire Co. and Celanese Corporation of America are passed, and then comes McKenzie Tower, where the Patterson Creek cutoff joins the West End. This important branch extends to the tower of that name, located 6.3 miles east on the East End of the division. The *National Limited* and *Diplomat,* as well as some through freights and many of the eastbound coal drags, use the cut-off to avoid Cumberland and to save 10 miles.

The line continues to follow the river, and in addition, the Western Maryland's Elkins line [May 1941 TRAINS] parallels the B&O as far as 21st Bridge, where the West End crosses the Potomac into West Virginia just before reaching Keyser. This is a live operating point, since helpers are serviced here, and some trains make crew changes. With a population of 6200, it is easily the largest intermediate town on the West End. Just west of the station are the large yards, which have a capacity of some 1900 cars. Eastbound coal drags are consolidated at this point into 100-car trains and the Mallet engines give way to Santa Fes on trains which will move via the Patterson Creek cutoff.

West Keyser is at the end of the yards, and then after some easy running, the line reaches Piedmont, which as its name indicates is at the very foot of the mountains. The small Cumberland & Pennsylvania makes connections with the B&O, and as the West End swings past the plant of the West Virginia Pulp & Paper Mill, the hills rise high on both sides. Then comes Bloomington and the real part of Seventeen Mile grade. The line follows the Savage River,

No. 11, B&O's Metropolitan Special, picks up a Western Maryland Consolidation helper (one of three leased from the WM) at Piedmont before tackling Seventeen Mile grade. Right below: Reading engine 1665, again doing pusher service, prepares to cut off a westbound extra before returning to Piedmont for the next run of heavy traffic.

Courtesy B&O Railroad.

although climbing far above it, and the scenery is splendid. At Bond all eastbound freights (except Diesel powered) stop for inspection, and here the large Savage River dam may be seen, still incomplete due to shortage of materials.

Between Bond and Strecker the curves are unusually severe, and the climbing through this section is about the toughest on the entire grade. The high rock cliffs echo the exhaust across the narrow valley as the Mallets blast their way toward the top. The Savage River gives way to Crabtree Creek, another thread of water which has carved a rocky gorge down in the very heart of the mountains. Just before Strecker is the short 399-foot Hitchcock Tunnel, and a similar distance beyond the tower is No. 37 Water Station, where many of the freights (and some of the passenger trains) pause to replenish their tanks.

Passing Swanton comes a momentary lull where the grade eases to about 0.45 per cent, and from here to the top, the curves are much easier, with the overall grade a shade under two per cent. Swanton flat seems to give an extra lease of life to the locomotives, and soon on the left is a white stone sign reading "Summit of Alleghanies, 2628 feet." (Most recognized authorities spell the word "Alleghenies.") This is the top! Helpers are cut off most of the trains here, and the line then crosses a 19-mile wooded plateau known as the "Glades."

Deer Park Hotel is the site of the once fa-

Courtesy B&O Railroad.

E. L. Thompson.

Clement's Fountain, Blazer and Tunnelton are but a few of the names denoting action on the heavy grades of Cheat River Canyon. At left the top of Tray Viaduct is just visible around the first curve to the right. Across the river smoke rises from a cement manufacturing plant at Manheim.

A westbound extra of 73 coal empties blasts its way across Tray Viaduct in Cheat River Canyon. Some approximation of the depth of the valley the viaduct crosses can be gained from the picture at the left. A Mikado is on the rear as even empties demand helpers on these grades.

mous hotel of that name, and both Mountain Lake Park and Oakland are thriving summer communities. A short distance to the north is the new artificial Deep Creek Lake, which is fast becoming an all-year playground. Soon the state of Maryland is left behind, and after passing the West Virginia State Tuberculosis Sanitorium on the right at Hopemont, the West End reaches Terra Alta. Here is located one of the most modern interlocking plants on the B&O. Westbound freights stop to turn up retainers and all eastbound drop helpers. Terra Alta means "high earth" and it is at the summit of Cranberry grade, so named because of the extensive cranberry bushes once found in the vicinity. Just beyond, as the train drops downgrade, is Salt Lick curve, and from here to Amblersburg, never-ending panoramas meet the eye as the line sweeps around one sharp curve after another. Amblersburg is wedged in by mountains on all sides, and the line follows a right angle curve past here.

Then comes M&K Junction, a spot of almost continuous activity. The coaling station is servicing nearly 150 engines daily, and has on occasions refueled more than 60 engines in an eight-hour shift. The numerous Mallets and Mikados used for helper service operate in both directions from this point, and in addition, connections are made with the B&O's M&K Branch (extending to Kingwood and Morgantown) and the Rowlesburg & Southern, a small lumber road whose interchange consists of several cars of lumber a week.

At Rowlesburg the line crosses the Cheat River and begins climbing the grade of the same name, threading its way along the side of Laurel Hill. For a part of the way the great Buckhorn Wall, a stupendous piece of masonry, bolsters the roadbed on the mountainside. One of the most difficult spots encountered by the early builders of the line was at Tray Run, and now the railroad crosses this deep gorge on a high viaduct. Clement's Fountain, a little

farther on, is unofficially known as the most picturesque point on the entire line, and the railroad has erected a small but attractive park from which to view this gorgeous canyon. From the roadbed clinging tenaciously to the side of the mountain, it is nearly 400 feet directly below to the Cheat River, which at this point parts company with the railroad.

At Tunnelton the West Virginia Northern interchanges coal with the B&O, and just beyond are the twin Kingwood tunnels, the old one a single track bore of 4154 feet, and the new one double tracked, slightly lower, and 4201 feet long. The descent of Newburg grade is not as thrilling as some of the other grades, but for a short distance the curves are very sharp, and then after passing the B&O's Racoon Valley coal branch, the line follows Three Forks Creek on an easy descent. The Cumberland Division actually ends, and the Monongah Division begins, at East Grafton, 2.2 miles short of the terminal, and the yard extends between these two points. Grafton itself is a railroad town of something over 7000, and has the questionable distinction of being one of the smokiest points in the country.

Maximum speeds on the West End are not high in comparison with other lines. Passenger trains are allowed 50 miles per hour from Cumberland to Piedmont and from Altamont to Oakland; elsewhere the limit is but 45 miles per hour. On the four descending mountain grades, this is lowered to 35 miles per hour with minimum time prescribed in minutes. Fast freights are allowed 45 miles per hour as far as Keyser, but from there west, the maximum is but 35 miles per hour. There are no prescribed speeds for descending grades, but the minimum time figures out at about 20 miles per hour. Slow freight and work trains are limited to five miles per hour less on Seventeen Mile grade and elsewhere they are 10 miles per hour slower.

The West End has two tracks or more throughout, with middle traffic tracks between Big Curve and Bond, Terra Alta and M&K Junction and Blaser and Hardman. Additional third tracks, classed as slow speed, are as follows: West Keyser-Piedmont, Piedmont-Kelley's Curve, Strecker-Altamont, Altamont-Wilson, Mountain Lake Park-Deer Park Hotel, Terra Alta-Hopemont. From Cumberland to

Amid the haze of smoke and hills east of M&K Junction is the division's busiest fueling station, where 150 engines are serviced daily, often 60 of these on an eight-hour shift. Helper engines operate in both directions from this point.

E. L. Thompson.

Courtesy B&O Railroad

One of the new B&O EM-1's pulls a heavy coal train through the outskirts of Cumberland. The tell tales warn of approach of Washington Street Bridge.

Viaduct Junction and again from East Grafton to Grafton the road is four tracked.

The entire line, including all of the slow speed tracks, is signaled by color-position automatic block, and nearly all crossovers permit speeds of 30 miles per hour. There are 14 interlocking towers and three additional telegraph offices. Remote control switches are located at various strategic points such as Big Curve and McMillan. Eastbound there is only one passing siding, but westbound there are six. The difference is occasioned by more eastbound slow speed tracks. In the 101.4 miles, there are 59.7 of double, 38 of triple and 3.7 of quadruple track; total length of passing sidings is about 6.6 miles.

Tonnage for the older articulated engines westbound from Cumberland to Grafton is 1300 and for the new EM-1's it is 1500. In fast freight service these ratings are lowered 200 tons. Eastbound the tonnage figures are 1500 and 1650 respectively, while fast freight ratings are 1000 and 1100. Each helper adds a corresponding figure, so it may be seen that three Mallets on coal drags up Newburg and Cranberry grades can handle 4500 or 4650 tons, depending on the lead engine; this is from 52 to 54 loads. Most westbound helpers are Mikados of the B&O and Consolidations of the Reading or Western Maryland, and they add 650 tons to the rating. Santa Fe S-1 engines are rated at 1050 west and 1175 east, although used only for occasional helper service on Seventeen Mile grade.

The 5400 horsepower freight Diesels are given 2150 tons westbound without assistance and 2050 eastbound. Helpers make the same additions as they do with steam engines. Diesels are used regularly only on the St. Louis section of No. 97 west and No. 94 east.

It is of interest that assistance in the form of an additional Mikado must be provided for eastbound coal trains from Mountain Lake Park to Altmont; other helper districts are: Piedmont-Altmont, M&K Junction-Terra Alta, M&K Junction-Blaser and Hardman-West End. The usual adjustments are made during unfavorable weather, of which there is a plenty on this piece of railroad.

Best scheduled freight time on the line from Viaduct Junction to East Grafton is five hours and 10 minutes, or an overall speed of 19.9 miles per hour. However there are only three west and five eastbound freights shown in the working timetable, and the balance of the movements, which total altogether an average of about 24 in each direction, are operated as extras. While the number of tonnage coal trains will vary, a good average is about 17 a day. The heaviest movement occurred from East Grafton on October 24, 1943, when 1702 loads were dis-

patched, and the record average movement is 1374 in the month of August, 1943.

Helper assignments on passenger trains vary. Light Pacifics can handle five cars without assistance and the heavy P-1d's are allowed six. Diesels are given extra helpers to keep the speed over 25 miles per hour and thus prevent damage to the motors. The heavier trains use a Mikado to doublehead the Diesel on the front end and a Consolidation pusher on the rear.

An interesting problem arose on the campaign trip of the late President Roosevelt when he returned from Chicago through Clarksburg. The train had 14 heavy cars and because of the nature of the party, helpers could not be attached to the rear. With only one Mikado assisting, the Diesel would unquestionably have fallen below 25 miles per hour on Cranberry grade and thus overheated the motors. The final result was one of the big EM-1's doubleheading the Diesel from Grafton to Terra Alta. And what a sight that made!

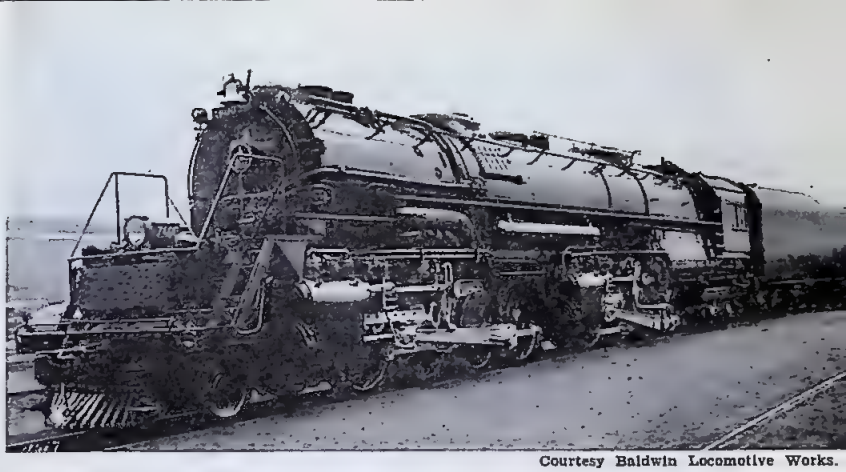
From the foregoing it can be seen that the passenger jobs utilize a great deal of motive power, particularly when it is remembered that the Diesels have more than 97,000 pounds of tractive effort. Three engines on any train make quite a picture, and for anyone who loves the bark of the locomotive exhaust, the noise of a Mikado and Diesel on the front end and a Consolidation on the rear can be highly recommended.

A thrilling sight occurs each night about 11:35 when the *National Limited* drops through M&K Junction and Rowlesburg as both the Diesel and Mikado roar past with throttles wide open, getting a run for Cheat River grade. With mountains towering on all sides to kick back the echo, and fire still dropping from the brake shoes after the long descent of Cranberry grade, this is a sight long to be remembered. For anyone who'd like to try a sample, overnight accommodations may be secured at a small but nice hotel directly across the tracks from Rowlesburg Station, and after Nos. 1 and 121 (the overflow section of No. 1) roll through, should one still not be sleepy, the show is repeated at 1:20 a.m. when the *Diplomat* flashes by on its nightly journey across the Alleghenies.

That's the story of the West End of the B&O's Cumberland Division, and it really is quite a show! To the railfan whose heart beats faster to the tune of mountain railroading, with frequent trains and many engines, no better tonic could be prescribed than this particular piece of railroad.

B&O's No. 7037, shown above at Rowlesburg, W. Va., is a true Mallet compound 0-8-8-0. The B&O has 17 of these locomotives in freight helper service over the Alleghenies on the St. Louis line. Below: the Q-4, Q-4a, and Q-4r locomotives, built by Baldwin, are the heaviest 2-8-2's in operation over the Cumberland Division. No. 4448, a Q-4a, boasts a tractive effort of 63,200 pounds.

C. A. Brown, Box 128, Rutledge, Pa.



Built by Baldwin Locomotive Works in 1944, No. 7600 is one of 30 EM-1's in use on the West End Subdivision. These 2-8-8-4 articulateds handle fast B&O freight runs and exert a tractive effort of 115,000 pounds.

Courtesy Baldwin Locomotive Works.

The Locomotives of B&O's Allegheny Grades

A partial list of engines operating on the Cumberland West End Division

Class	Numbers‡	Type	Driver diam., in.	Wt. on drivers, lbs.	Cyl. diam. and stroke, in.	Steam pressure, lbs.	Tractive effort, lbs.	Weight, lbs.		Date built
P-1aa	5051-5088	4-6-2	74	194,000	26x32	190	47,300	308,500	BLW	1911
P-1b P-1ba P-1c	5065 5080, 5089 5001-5090	4-6-2	74	191,000	26x28	215	46,700	299,000	#BLW	1911-12
P-1d	5003-5094	4-6-2	74	200,000	26½x28	225	51,000	317,000	#BLW	1911-12
P-1da	5000-5075	4-6-2	74	200,000	26x28	225	48,900	311,000	#BLW	1911
Q-1aa	4000-4148	2-8-2	64	223,600	26x32	190	54,600	282,200	BLW	1911
Q-1ba	4150-4219	2-8-2	64	223,600	26x32	190	54,600	282,200	BLW	1911
Q-1c	4082-4329	2-8-2	64	222,000	26x32	190	54,600	284,500	BLW	1913
Q-4 Q-4a Q-4r	4400-4445 4446-4449 4450-4634	2-8-2	64	247,000	26x32	220	63,200	327,400	BLW	1921-23
S-1 S-1a S-1s	6100-6174 6175-6224 6108	2-10-2	64	347,230	30x32	220	84,300	436,510	BLW&Lima	1923-26
T	5500	4-8-2	74	275,000	29x30	225	65,300	400,000	B&O	1925
T	5501	4-8-2	74	275,000	30x30	220	68,200	400,000	B&O	1926
T-1, 2	5510, 5550	4-8-2	74	260,000	27½x30	250	65,000	385,000	BLW	1930
LL-1	7021-7037	0-8-8-0	56	461,000	26&41x32	225	112,400	461,000	Alco	1911-12
LL-1	7041-7047	0-8-8-0	56	471,000	26&41x32	215	107,000	471,000	Alco	1913
EL-1a	7100-7113	2-8-8-0	58	462,500	*4-24x32	*220	*118,800	485,600	BLW	1916
EL-2a	7200-7214	2-8-8-0	58	470,800	*4-24x32	*220	*118,800	493,000	Alco	1916
EL-3a	7115-7144	2-8-8-0	58	459,400	*4-24x32	*220	*118,800	484,400	BLW	1917
EL-4	7020-7039	2-8-8-0	56	455,300	26&41x32	225	112,400	471,300	Alco	1911-12
EL-4	7040, 7049	2-8-8-0	56	466,500	26&41x32	215	107,400	482,500	Alco	1913
EL-5a	7145-7170	2-8-8-0	58	466,300	*4-24x32	*220	*118,800	491,300	BLW	1919
EL-6a	7300-7315	2-8-8-0	63	456,700	4-25x32	200	108,000	492,000	Alco	1917-18
EM-1	7600-7629	2-8-8-4	64	485,000	4-24x32	235	115,000	628,700	BLW	1944
WM H-9	801-840	2-8-0	61	287,910	27x32	220	71,500	309,910	BLW	1921-23
Rdg I-9Sa	1650-1699	2-8-0	55½	250,800	25x32	210	64,300	281,700	BLW	1918-19
Rdg I-9Sb	1625-1924	2-8-0	55½	254,000	25x32	210	64,300	285,000	BLW	1920

‡ Numbers shown are first and last; not necessarily all intermediate.

Converted by B&O Railroad.

* Each class minus the "a" sub-classification is compound with 26 and 41 x 32 cylinders, 225 pounds pressure and 108,500 pounds tractive effort.

Passenger Diesels have 97,000, 101,400 or 104,650 pounds tractive effort—Electro-Motive Corp.

Freight Diesels have 220,000 pounds tractive effort—Electro-Motive Corp.

They Bracket the Brazos

Two contrasting Texas short lines which connect with the Texas & Pacific just west of Fort Worth

STORY BY LUCIUS BEEBE
Photos by Beebe and C. M. Clegg*

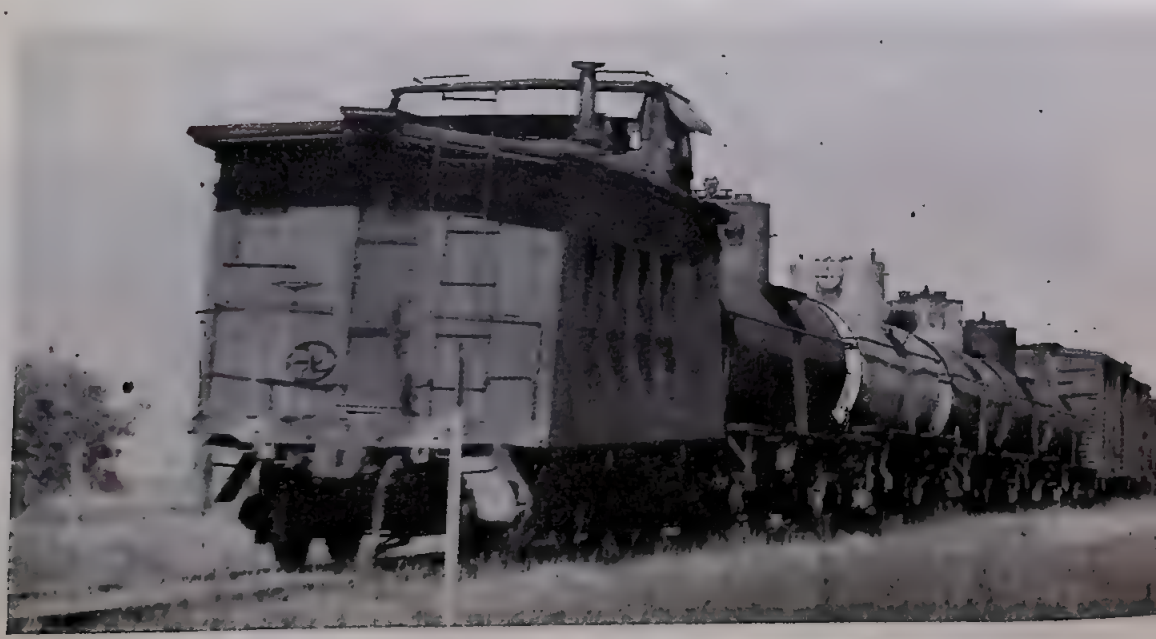
The structurally and geographically mighty interlocking interests of the Missouri Pacific-Texas & Pacific-International-Great Northern Railway companies, allied in economic empire and closely identified in internal financial economy, dominate an operational terrain which extends from El Paso to New Orleans and from St. Louis to Laredo. A passenger ticket from New Orleans to El Paso will take its holder over 1167 miles of the high iron of the Texas & Pacific Company alone, while a ticket over the connecting routes of the Texas & Pacific and Missouri Pacific, from St. Louis to El Paso by way of Texarkana, covers 1356 miles over the right of way of jointly owned and operated railroad systems. Their through cars operate north and south, east and west through as richly imperial a domain as can well be imagined by the most avaricious industrialist.

As must necessarily be the case with any dominant transcontinental trunk line, the westering rails of the Texas & Pacific are nourished and sustained by a multitude of feeders. Companies operating under the administration of interlocking directorates and the financial structure of the parent holding company include the Abilene & Southern Railway, the Pecos Valley Southern, the Fort Worth Belt Railway, the Texas-New Mexico, the Texas Short Line, the Texas Pacific-Missouri Pacific Terminal Railroad of New Orleans, the Denison & Pacific Suburban and the Weatherford, Mineral Wells & Northwestern Railway Company.

Let us, through the eyes of amateurs of successful railroad operations rather than of the infinitely complex financial structure they serve, examine the Weatherford Mineral Wells, and an adjacent feeder, the independent Wichita Falls & Southern.

The Weatherford, Mineral Wells & Northwestern is a Class II railroad with very rich relatives, living an upholstered way of life, elegantly groomed and housed, a pet and showpiece of the family. The Wichita Falls & Southern is characterized by a far less fashionable station in life; it has substantial friends and business acquaintances, including the Texas & Pacific itself as well as the

* Photos from Lucius Beebe's new book, "Highball, a Pageant of Trains," to be published this month by D. Appleton-Century Co., at $6.



Home and Office

At Ranger, Tex., the depot of the Wichita Falls & Southern is also a dwelling for the local agent and its state of maintenance would be just grievance for some landlords.

Missouri-Kansas-Texas, the Rock Island and the Fort Worth & Denver City (Burlington), but its manner of life and appearance is far removed from the stylish graces of the Weatherford Mineral Wells and it lives on the other side of the tracks both factually and metaphorically.

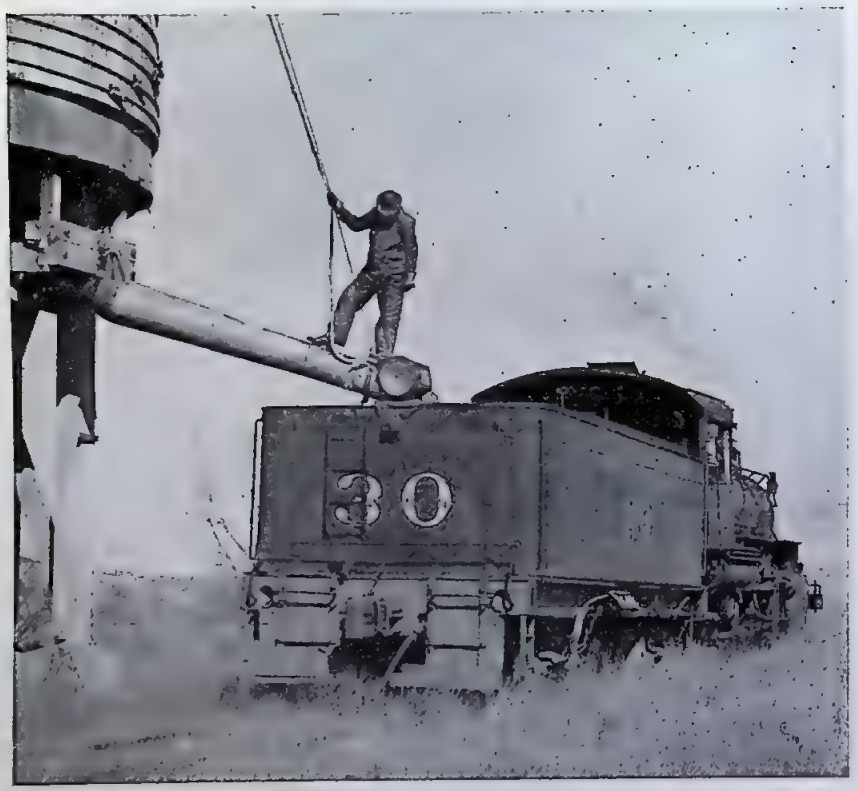
The Wichita Falls runs over something like 170 miles of not over-ballasted iron between the town of its incorporated name near the Oklahoma boundary in Texas and Dublin, Tex., on an almost north and south axis. During its progress over this hilly portion of the Texas landscape it passes through Breckenridge, Breckwalker, Ringling Junction and Ranger, at the last of which points it crosses the T&P main line at right angles just 95 miles west of Fort Worth. At Ringling Junction, until as recently as 1944, it met the rails of another short line, the Eastland, Wichita Falls & Gulf, but this line was torn up for lack of business despite the then current war which was booming oil rates in all the Texas fields.

The rails of the Wichita Falls & Southern Railway, which together with the property of the Wichita Falls, Ranger & Fort Worth now is the Wichita Falls & Southern Railroad, were laid in the '90's. Most of them bear the legend "Carnegie, 1890" and weigh a worn 65 pounds. At times they disappear entirely in the tall grass of the meadows through which the right of way runs; most of its installations are of the genus derelict, and it is the feeling of the impressionable observer that if ever a railroad were haunted by slightly seedy ghosts, this is it.

Pause of a March noontide in a windswept Texas pasture where, errant and unfenced, the shorthorn steers browse on the grass which grows untended through the ties and between the rails of the Wichita Falls. A few miles to the south over the hilltops a rolling cloud of coal smoke indicates that No. 44 is bound northward on its every-other-day run. At times the smoke plume advances with startling velocity, at others it is apparently static although there are no operational reasons for the train to pause in this desolate region. The truth of the matter is that No. 44 rolls downhill with ease and gusto but slows to a scant couple of miles an hour on any grade at all. Its 15 tank cars followed by a caboose the size of a modest suburban villa dip and sway over the rails like dancers in an improbable gavotte. The locomotive, a 2-8-0 of early 1920 vintage, leaks steam at every pore and an appreciable

Wayside Mural

This deserted farmhouse in an uncut meadow is the Wichita Falls & Southern McLennan station.



After setting out its cars on the Texas & Pacific exchange track at Ranger, Tex., No. 30 takes a drink at the haunted water tower before heading north for Breckenridge. At right: Lacking a caboose of its own, the Weatherford, Mineral Wells & Northwestern settles for an ignominous Texas & Pacific crummy on its daily 44-mile round trip.

The photo across the two preceding pages, by C. M. Clegg, shows the WMW&NW daily train in action.

At right below is the Wichita Falls & Southern's tri-weekly train crossing the main line of the Texas & Pacific at Ranger. The crossing is cleared by the brakeman from a booth nearby.

amount of its vapor is spent through casual channels without ever reaching its steam chests.

Snorting, rolling and rocking under an undulant cloud of soot, the little train recedes in the direction of Ranger. At McLennon it passes the railroad's sometime depot, a deserted farm house set back 10 feet from the rails and sheltering a live wall telephone connection with other company outposts.

At Ranger No. 44 sets out a handful of cars on the T&P exchange track, picks up six empties and two carloads of cattle feed for Breckenridge and a carload of valuable pipes and derrick rigging for the North Texas oil fields, and the crew ties down the train and ventures across the state highway for chow at Mrs. Higdon's cafe. At Mrs. Higdon's the brains encounters the local agent for the Sinclair Refining Company's Pipeline Department whose property they are taking north after lunch, and safe delivery at Wichita Falls is promised over pie á la mode.

After lunch No. 44 comes protestingly to life. The head shack runs ahead to the booth to which he carries a key to close off the T&P main line. The clattering Consolidation takes on a tankful of water at an ancient tower that is almost certainly the abode of whatever haunts desolate railroads, and early afternoon sees it out on the remaining 130 miles of its run which, God willing, will bring it to Wichita Falls by 10 in the evening. This is a busy day's operations on the Wichita Falls & Southern.

The railroad maintains nine locomotives, 110 freight cars, five passenger cars and 127 employees.

A few miles northeast of Ranger runs the famed Brazos River, almost as much of a Texas landmark as the Pecos, and above it in the high, rocky fastness of the Texas hills is the spa and resort town of Mineral Wells. Years ago a considerable tourist trade came to Mineral Wells to put up at its vast hotel and sluice their innards with its waters, but today its most celebrated product is Crazy Springs Mineral Water and this is largely exported. Its properties were found to be much the same if consumed in Seattle or Providence as when drunk at its source, and less inconvenient. The Weatherford, Mineral Wells & Northwestern now ferries its passengers by omnibus, but more than a million gallons of Crazy are bottled annually for off-premises consumption and this, and the dairy products of the Lake Pinto region, maintain one of the most elegant little railroads in operation in North America.

A daily train operates each way over its manicured main line where heavy iron, rock ballast and a general air of prosperity suggest a transcontinental trunk rather than a 22-mile short line with a single locomotive. Its motive power is a gleaming, oil burning Consolidation with the company's name on the tender, but its consist ends in the indignity of a T&P caboose. The 2½ per cent grades at Wolters and Garner are nothing to it and the down train rolls into the T&P main line at Weatherford with all the haughty clamor of any redball freight.

Against the nine locomotives, 127 employees and annual operating revenue of $325,896 of the Wichita Falls & Southern, the Weatherford, Mineral Wells & Northwestern, its aristocratic neighbor, maintains one engine, 43 employees and shows an annual operating revenue of $206,000. The moral to this story simply is that to him that hath shall be given and that there is no better way to acquire wealth than to be born to a wealthy family.

From the GI Mailbag

A COLLECTION OF SERVICEMEN'S NOTES

From France At last I had a ride on a French railroad! You've heard of 40 and 8 cars—the box cars for either 40 men or 8 horses. Four wheels. Well, we didn't ride in them but in American built four-wheelers, gondolas. Imagine how we looked—I was in the second gon from the tender! The trip included a tunnel or two.

I had a chance to see something of French signaling. At the signal, a ramp is between the rails. Presumably a bar or roller is beneath engine or tender pushing the bar down. This in turn operates a system of levers and pulls on wire, which opens the last block and trips the block just entered.

Block signals appeared to be disks or diamond shapes. A clear block is indicated by the signal being faced on edge—an occupied block by the disk or diamond facing against traffic. Usually a piece of red glass is inset to match against a signal lamp.

The mess of wires and counterweights and levers makes one think of Rube Goldberg. In the yards the wires sprawl everywhere, and often go overhead—I saw young pole lines with 20 to 30 wires and their multiple pulleys.

Roadbeds are tops. Anticreep devices are more complicated than on U.S. trackage and many more employed. They're bolted through rail web and clawed to fit down over lag screw heads of rail bolts. Occasionally I saw spikes; normally only lag bolts are used.

Many tank cars of U.S. make are used, all our own Transportation Corps marking. Except for couplings, bumpers and, I suspect, air hose, they are standard U.S. in every respect. They dwarf almost all French equipment except the first class passenger equipment.

Second and third class passenger equipment is chewed up—lack of care. First class and Wagon Lits looked as if work had been done.

Locomotives: Some of them must have been 50 years old. Actually seemed smaller than some of our 1880 American types. I saw a few huge 4-8-2's without tenders, a sort of tank type such as B&A suburban tank types.

French trainmen carry bottles of wine and the inevitable leather boxes. They look like the owner of a miniature camera starting out for the day. Wine drinking at work appears to be perfectly natural from what I observed.

Uniforms: As long as he has a hat with a visor, he's o.k.!

Switching is done with hand waving (like us) plus flags and whistles just like a cop blows.

Triple switches are relatively common and slip switches very common. I saw no indications of motor or pneumatic switches but saw a fair use of cable operated switches.

I saw cars from Germany, Switzerland, Belgium, Italy, Netherlands and Bulgaria but no cabooses such as we know. Hauls are short and cities are close together. Many freight cars have a small dog coop on one end for the brakeman to wiggle into.

Capt. Alex Darragh.

From Saipan Here at Saipan I have seen locos numbered as high as 18 and all are about the size of an elevated railroad Forney. Some are 0-4-0's but six-wheelers predominate. Most of them are full of holes. There must be some railfans here because the number plates are going fast. Track is bad and the motor trucks are knocking the rail off the ties at unused grade crossings. The line was used mostly and must be owned by the sugar mill but I can't read Jap yet so don't know for sure.

S/Sgt. W. R. McGee.

From the Phillipines The 3-foot 6-inch gauge Manila Railroad System runs in a southerly direction from San Fernando, La Union, some 175 miles to Manila, then southeast to Legaspi, Albay, about 250 miles. Total trackage is 704 miles, all but a small portion of which is single. Main line uses 65 pound rail, feeder lines 45 pound, and each sugar central has a light weight rail system for hauling cane from its outlying haciendas to the feeder lines. Before the war the

All photos on this page, Capt. Edward A. Fiedler.

road averaged 2,000,000 tons of freight annually and carried 8,000,000 passengers. Materials transported in order of importance were: sugar cane, rice, copra, to-

The Budd type stainless steel cars above are used in multiple unit electric suburban service out of Montparnasse Station, Paris, where they are shown on the Versailles-LeMans line. The station below is at Monmorency at the end of a 1.8 mile long branch line. Quaint double deck coach is used on this line. The suburban cars running into the Nord Station, Paris, have the locomotive on the rear of the train operated by electro-pneumatic controls from the front car.

F. R. Smith Jr

bacco, lumber and copper minerals.

Locomotives number 160 of which 106 were in service prior to 1914. These are of the 0-6-0 and 0-8-0 types. The balance is divided among 45 ton Porters (4-6-0), 66 ton Baldwin Pacifics, 71.6 ton Baldwin Mikados, 94 ton Texas types and 91.5 ton American Mountain types.

The prewar run to San Fernando from Manila took 14½ hours and to Legaspi 13 hours. Daily trains northward out of Manila were 15 in number: four freight, six passenger, and five of mixed consist.

Fuel used before the war was coal imported from Calcutta and Australia; also some wood. Eight Pacifics and Mountain type locomotives and three switchers were oil burners. Due to shortages the Japs substituted wood and copra for coal.

When we landed here, we of course brought our own motive power (see picture). Service has been restored and as a result the system is providing a valuable transportation link. Though the Japs did their best to destroy it, our men were able to have the road in operation soon after Uncle Sam took over.

Sgt. F. R. Smith Jr.

From New Zealand Government owned and operated, the New Zealand Railways are divided into two distinct systems by the geographical separation of North and South Islands. Each system is 3-foot 6-inch gauge, but this less-than-standard span between rails is of little handicap to size and no handicap to efficient operation of an extensive and busy system.

There is an interesting mixture of American and British practice and custom. Roadbed, track construction, ties and rails seem completely American, yet the throw handles or switch levers are English. Color light signals and grade crossing warning devices are American but older semaphore signals have a British cast. As to rolling stock, passenger coaches and locomotives present a compromise between the development in England and America but goods wagons (freight cars) are almost all the small English four-wheel type of eight to 12 ton capacity.

There are some splendid locomotives, many of the largest being

Left, Roger Borrup; above, Courtland Christian

Left, Pfc. E. Grudzielanck; above, S. A. Rockliff, St. Kilda, Dunedin, N. Z.

New Zealand built. There are tank engines for local runs, switching and use in the yards, but tender engines handle all the mainline runs. Prairie and Pacific types are common, but the main expresses are hauled by Mountain type locomotives, powerful in appearance, as they are built massively to the full size of gauge and clearance limits.

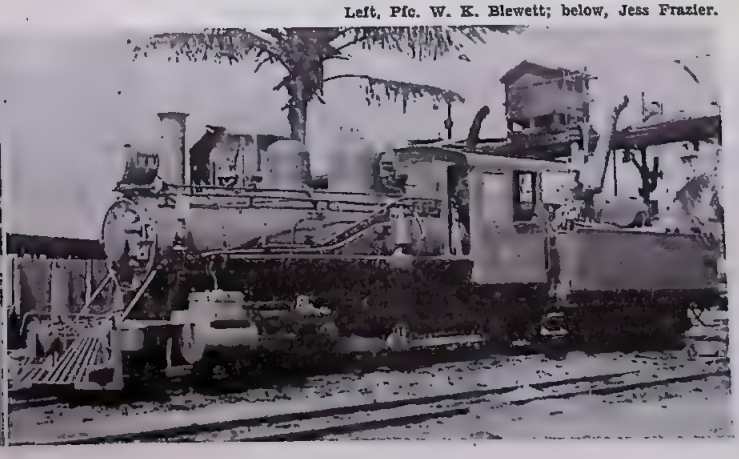
Two sleeping car expresses run between Auckland, the largest city, and Wellington, the capital. This 426-mile run consumes 14 to 16 hours. Speed is slow not from lack of competition, but because all except a few miles out of Auckland is single track, grades and curves are short and sharp (and very numerous) and traffic, for a single line, is heavy.

Lt. W. C. Moore, U.S.N.R.

The GI Mikado at far left runs on the 3-foot 6-inch gauge Manila Railroad. The train running through a deep wooded valley which might be New England is actually pulling out of Mytkyina, Burma. The semi-streamlined locomotive climbing a two per cent grade with a passenger train is one of the New Zealand Railways J class Mountain types built by the North British Locomotive Co. in 1939. The New Zealand system is 3-foot 6-inch gauge.

At far left below is the 2 p.m. train out of Bari, Italy, on the Mediterraneo Calabro Lucani. The locomotive is a 2-6-0T. The auto which has just prevented two 3-foot 6-inch gauge Java Railways Baltic tankers from colliding is a full size Studebaker Champion. Who says narrow gauge engines are small? The Diesel electric switcher and the outside frame 4-6-0 (built by Lima in 1906) represent old and new motive power on the three-foot gauge Oahu Railway, which has recently been rather busy on its lines between Honolulu and Kahuku. [See July 1944 Trains.]

Left, Pfc. W. K. Blewett; below, Jess Frazier.



Postwar Parade: 2

The gas turbine, a new type of motive power, appears on the horizon; Swiss have one unit in operation while Allis-Chalmers proposes to build them in this country.

BY A. C. KALMBACH

The gas turbine is an essentially new type of prime mover. It is very new. The first experimental unit was built in 1930, the first propulsion turbine in 1937. Yet this fourth great type of heat engine already is a sensation of the engineering world, for it has some advantages and different capabilities than its predecessors, the steam engine, the steam turbine and the internal combustion engine. In war the gas turbine came almost too late to meet wide application, but it was spectacular as the so-called jet propulsion. In peace it will almost certainly find usefulness for many power purposes, including locomotives.

At first glance the gas turbine looks like a steam turbine. But it burns its fuel right inside the motive unit, and so is more like the internal combustion engine. In fact, it might well be called the internal combustion turbine and the English do call it the combustion turbine. Its chief advantage lies in its utter simplicity. Compressed air and burning fuel are turned directly into rotary motion by the turbine blades, without any intervening boiler, crankshafts, or valves. But it lacks the heat advantage of steam, which gains heat units without increase of temperature in the change from

water to steam, and so it must operate at a higher temperature to match the efficiency of the steam turbine. That is its principal disadvantage, and the development of the gas turbine has been mostly a battle of metallurgy to create thin turbine blades which can operate continuously at red heat.

Thermal efficiency of the gas turbine is more than twice that of the ordinary reciprocating locomotive steam engine, but not equal to that of the Diesel engine. However, the turbine burns cheap fuel, bunker oil, and the fuel cost in dollars is often less than the Diesel. The use of pulverized coal in the turbine is now being worked out by the Locomotive Development Committee and when this becomes a reality the gas turbine, operating on the country's cheapest and most plentiful fuel supply, will surely become an extremely popular form of motive power.

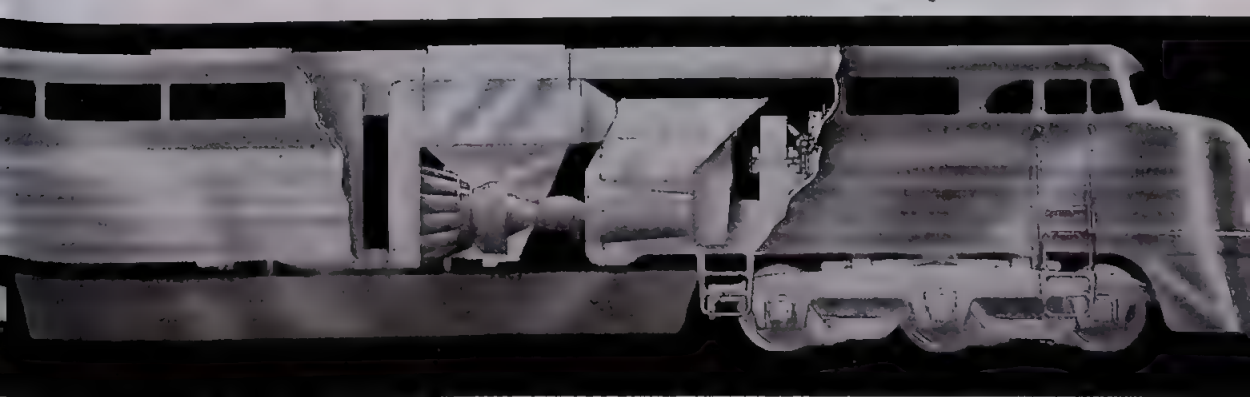
The operating characteristics of the gas turbine locomotive will be very similar to those of the Diesel electric, but a unit of equal horsepower will be only about half as long and about half as heavy. No water will be needed for either cooling or steam, and since the only moving parts are journals rotating in bearings the use of lubricating oil will be very light. Maintenance is expected to be less than with either Diesel or steam engines, both of which have reciprocating parts.

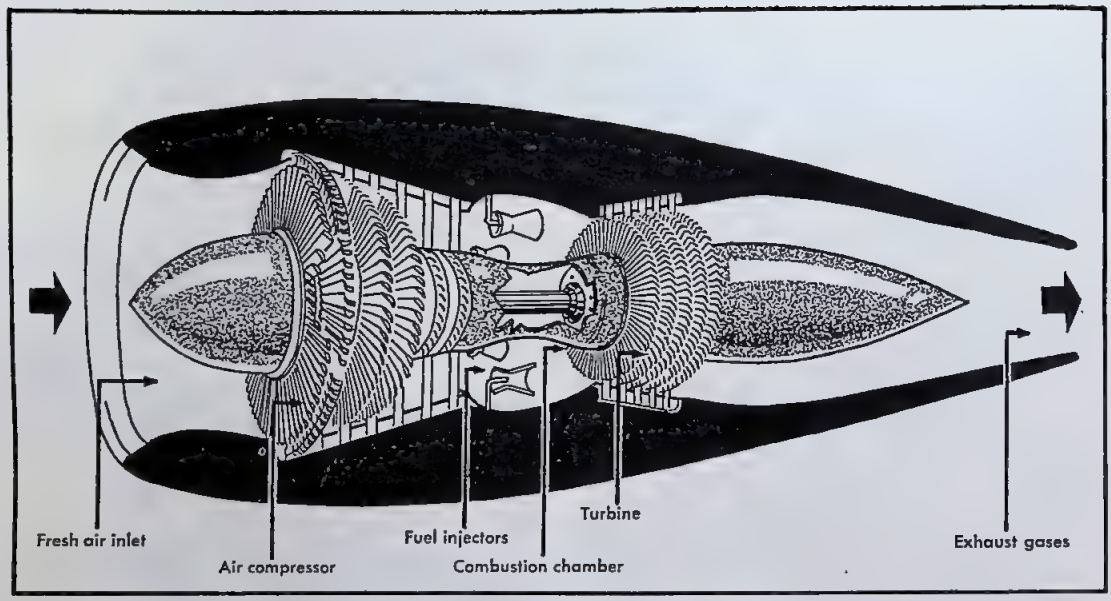
First cost of new locomotives is another big factor. A Diesel electric locomotive costs about three times as much per horsepower as a steam locomotive, and so must produce ton miles at less operating cost in order to justify the greater investment. The thousands of Diesels in service point to the fact that the first cost disadvantage has been successfully overcome, at least in many specific applications. The gas turbine locomotive will probably cost about 10 per cent less than a Diesel electric, and yet offer about the same operating advantages.

Like the Diesel engine, the gas turbine is not well suited to production of high horsepower over a wide speed range, and so some transmission must be used between the turbine and the locomotive driving wheels. Westinghouse and General Electric are interested in gas turbines for railroad locomotive use and both will of course use electric transmission. The third American manufacturer planning to put this new type of motive power on the rails is Allis-Chalmers, Milwaukee, whose engineers favor hydro-mechanical transmission but will actually use the electrical transmission because it is already in wide use in Diesel locomotives and so will meet with less maintenance and development trouble. After the gas turbine has been proved as a reliable and desirable type of railroad motive power the Allis-Chalmers men believe further development should include the mechanical transmission in order to achieve the ultimate in locomotive design. Such a transmission would include a reduction gear, torque converter, and hydraulic coupling and would essentially duplicate the performance of electric transmission but with less first cost and maintenance.

The gas turbine literally lifts itself by its own bootstraps. The unit consists mainly of two turbines on a single shaft. One acts as a com-

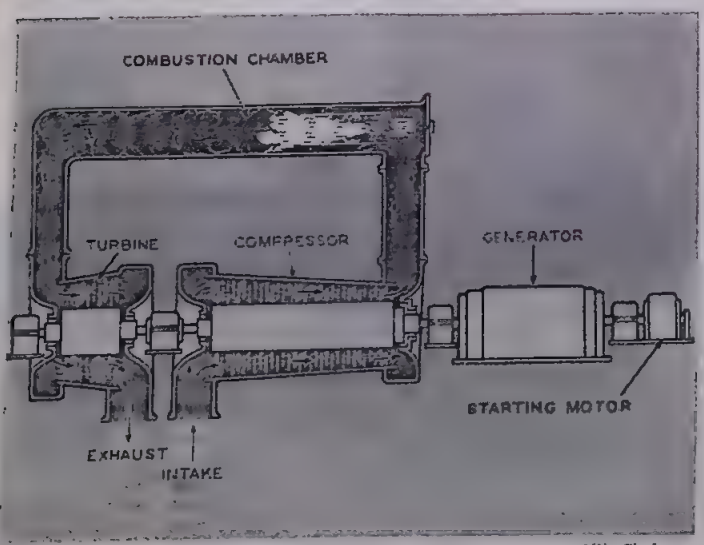
The proposed Allis-Chalmers road locomotive powered by gas turbines with electric transmission heads the opposite page. Below it is shown in cutaway side elevation. The combustion turbine is closest to the center of the locomotive and the longer, smaller turbine is the compressor. The generator is in back of the cab, and of course all the machinery is duplicated in the rear half.





pressor, the other as a power turbine which drives the compressor and also has excess power which runs the locomotive. Intake air is heated in a heat exchanger by the exhaust gases from the turbine and is then fed into the compressor. Here both temperature and pressure are increased. The hot air from the compressor is then fed into a combustion chamber where fuel is admitted and burned. Air is used in such excess that the temperature does not get higher than the turbine blades can stand and also the fuel is completely burned with no smoke from incomplete combustion. The hot gases of combustion then escape to atmospheric temperature and pressure by expanding through the propulsion turbine, giving up their last heat to the heat exchanger mentioned at the beginning of the cycle.

With low turbine temperature the gas turbine can produce little more than enough power to run the compressor, and thus is only an efficient producer of hot air. But as the turbine temperature is increased the excess power of the driving turbine becomes greater and the efficiency as a prime mover goes up. Thus the greatest efficiency is attained by running the gas turbine at full working temperature. Likewise the gas turbine is most efficient at full speed. Full speed at full temperature is full load, but a locomotive gas turbine must be frequently accelerated from no load to full load, and means of controlling the turbine have been worked out which involve a combination of variable temperature, constant speed over part of the range and constant (full) temperature, variable speed over the other portion of the range.



Allis-Chalmers.

The gas turbine is reduced to its essence in the jet propelled plane, shown at top of page. A locomotive application is shown at left. The cycle of air through compressor, combustion chamber and drive turbine is indicated by arrows.

When two duplicate gas turbines are used in the same locomotive better efficiency can be obtained by using only one turbine up to the limit of its horsepower, then starting the second turbine and accelerating it while the first continues to operate at full load and maximum efficiency. Another device for better acceleration is to operate the turbine during the brief accelerating period at higher than normal temperature. This can be safely done for short periods of time.

In warm climates the gas turbine loses some of its efficiency because the hot gases cannot use as much of their heat before exhausting. On the other hand the hot gases can give up much more of their heat before exhausting into winter temperatures, and the increase in power at cold temperatures is said to be enough to heat trains by electricity generated on the locomotive as in European practice. Both the Diesel and the steam locomotive maintain approximately constant efficiency regardless of outdoor temperature.

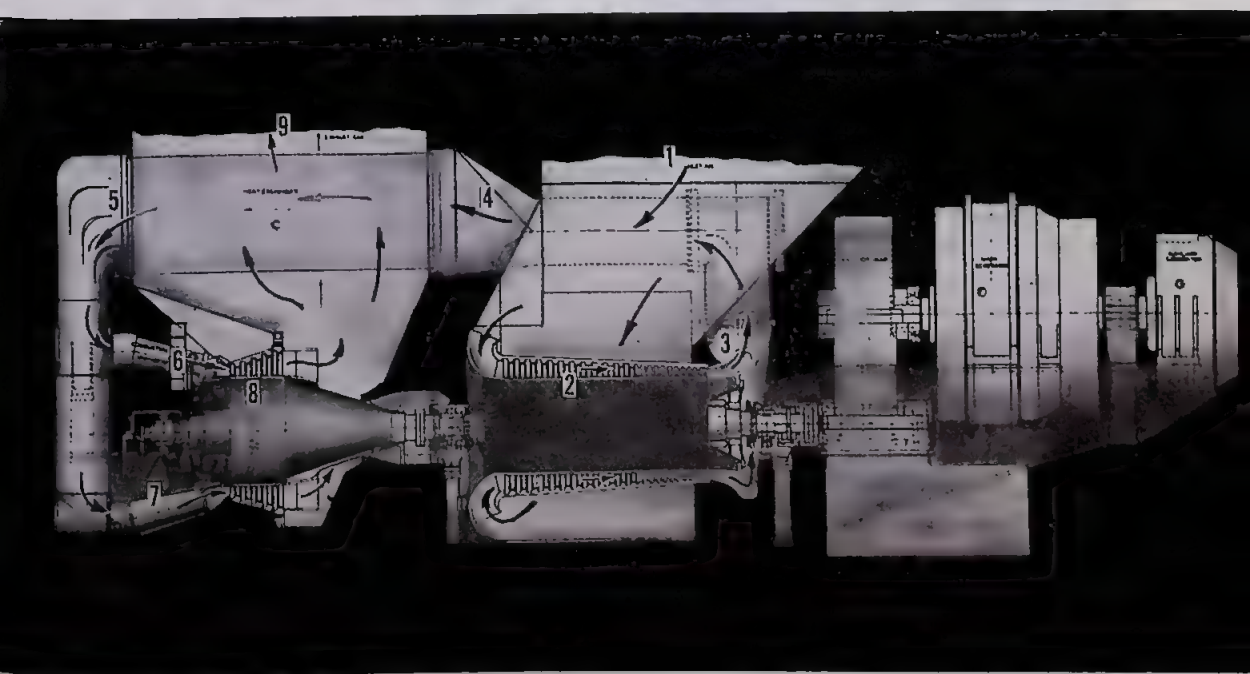
The proposed Allis-Chalmers road locomotive is of 4800 horsepower with two duplicate 2400 horsepower gas turbines each driving, through a reduction gear, direct current main and auxiliary electric generators. The main generator is connected to the motors which drive the axles exactly as in the Diesel electric locomotive.

Overall length of this proposed unit is 90 feet and the distance between bolster centers is 58 feet 4 inches. The two three-axle trucks of 16-foot wheel base have 52-inch diameter wheels and each axle is powered by a nose-hung direct current traction motor. The estimated weight of the locomotive is 225 tons, with some possibility of weight reduction by using lighter metals.

The filters for the intake air to the gas turbine compressor units are located high on both sides of the cab. This location helps prevent picking up grit from the roadbed. The exhaust gases are discharged through the roof. A conventional oil burning boiler is used for train heating, although it is possible to use waste heat in exhaust gas to heat water.

It is planned to use a relatively low grade fuel oil and so provision is made for fuel heating. This will probably be done with exhaust gas from the turbine, although electricity or steam could also be used. For starting purposes the light auxiliary engine fuel, which would require no preheating, would be used until the turbine establishes a flow of hot exhaust

Here is the combustion turbine unit of the proposed Allis-Chalmers locomotive in more detail. Air enters at 1, goes through the compressor (2), follows numbers 3, 4 and 5 through the heat exchanger, and into the combustion turbine through combustion chambers 6 and 7. It exhausts through heat exchanger at 9.



Allis-Chalmers.

The gas turbine locomotive which has been in experimental service on the Swiss Federal Railways since 1941 looks very much like a conventional European electric locomotive. It is of 2200 horsepower. The engineer's control panel is shown at the left. The large wheel is the main valve, and the smaller control wheel at the far end regulates the temperature.

gas. Fuel tank capacity is 4000 gallons, enough for about a 10 hour run. Lubricating oil tanks carry 1500 gallons, and other tanks under the center of the cab between the trucks carry 2600 gallons of water for train heating. The two 300 gallon tanks for auxiliary engine and steam generator fuel are in the rear of the cab. No water is required for cooling purposes.

The gas turbine is started by motorizing the main generators and using them for turning over the turbine until compression is built up. An auxiliary engine set of 150 horsepower is used to provide current for this purpose. This auxiliary power can also be applied directly to the traction motors to drive the unit up to about 15 miles an hour, so that the locomotive can be moved about the yards without starting the big turbines. Train controls and associated electrical equipment are in the nose of the locomotive.

The development of the gas turbine locomotive for Allis-Chalmers was in charge of J. T. Rettaliata, manager of research and gas turbine development.

One gas turbine locomotive is already in service. It was built for the Swiss Federal Railways in 1941 by Brown, Boveri & Co. and has a rated horsepower of 2200. Because of the war the turbine blades could not be built of as high temperature steel as would now be possible, and so the thermal efficiency of the Swiss unit does not compare with what we may expect soon. Efficiency at the drawbar for this locomotive is about 15 or 16 per cent, as against 26 to 28 per cent for the usual Diesel electric and six to eight for the usual reciprocating steam locomotive. Allis-Chalmers expects its units to have an overall efficiency of about 20 per cent.

Because the Swiss experiment is the first of a genus it is well worth study. It is a relatively high unit intended for service on branch lines where the traffic density does not justify electrification. It has a maximum axle load of 35,200 pounds, and a total weight of 101 tons. The starting tractive effort is 29,000 pounds, and at 45 miles per hour it can exert a continuous

tractive effort of 11,000 pounds. Maximum speed is 70 miles an hour. Control cabs are located at both ends. The Swiss haven't had enough liquid fuel in the last four years to run really extensive service tests with the gas turbine locomotive, but it has been tested at sufficient duration and over enough variety of trackage to demonstrate that it met and even exceeded the guarantee. On one occasion it took a train of 430 tons, including locomotive, over a 100.2 mile run with a net rise in elevation of 906 feet in a net running of time of 130.5 minutes after deducting for the nine stops. This made an average running speed of 46 miles per hour, and when the acceleration and deceleration for the nine stops are considered it can be seen that this is a creditable performance for a unit of 2200 horsepower.

Thus a new type of locomotive enters the scene. It looks like a Diesel—no flashing rods to add fascinating action. But it isn't a Diesel, and it isn't a steam locomotive nor a steam turbine. Only time will tell whether it will assist the Diesel in displacing the steam locomotive, or whether it might even turn about and assist the steam locomotive in displacing the Diesel. One thing seems sure. Technical genius has only begun to develop better power plants to ride the rails.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933.

Of Trains, published monthly at Milwaukee, Wis., for Oct. 1, 1945

State of Wisconsin, County of Milwaukee, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared A. C. Kalmbach, who, having been duly sworn according to law, deposes and says that he is the editor of TRAINS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor and business manager are: Publisher, Kalmbach Publishing Co., 1027 N. 7th St., Milwaukee 3, Wis.; Editor, A. C. Kalmbach, 4521 W. Woodlawn Ct., Milwaukee, Wis.; Business Manager, H. H. Kirtland, P. O. Box 215, Pewaukee, Wis.

2. That the owner is: Kalmbach Publishing Co., 1027 N. 7th St., Milwaukee 3, Wis.; William B. Calhoun, 6036 Marquita, Dallas, Tex.; Drayton Cochrane, 157 E. 63rd St., New York, N. Y.; W. D. Collett, 2142 E. 97th Pl., Chicago, Ill.; Capt. A. L. H. Darragh and Ruth O. Darragh, 5036 N. Wayne Ave., Chicago, Ill.; Robert J. Fakler, 2874 S. Delaware Ave., Milwaukee, Wis.; Arthur E. Hughes, 605 Murdock Rd., Baltimore, Md.; A. C. Kalmbach, 4521 W. Woodlawn Ct., Milwaukee, Wis.; Bernice G. Kalmbach, 4521 W. Woodlawn Ct., Milwaukee, Wis.; Henry H. Kirtland, 403 Lake St., Pewaukee, Wis.; J. C. O'Hearn, 1609 N. 48th St., Milwaukee, Wis.; M. D. Thornburgh, 105 S. Mulberry St., Chillicothe, O.; Linn H. Westcott, 1262 N. 39th St., Milwaukee, Wis.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only).

A. C. Kalmbach, Editor

Sworn to and subscribed before me this 28th day of September, 1945,

Mildred Gallasch, Notary Public

[SEAL] (My commission expires Oct. 31, 1948.)

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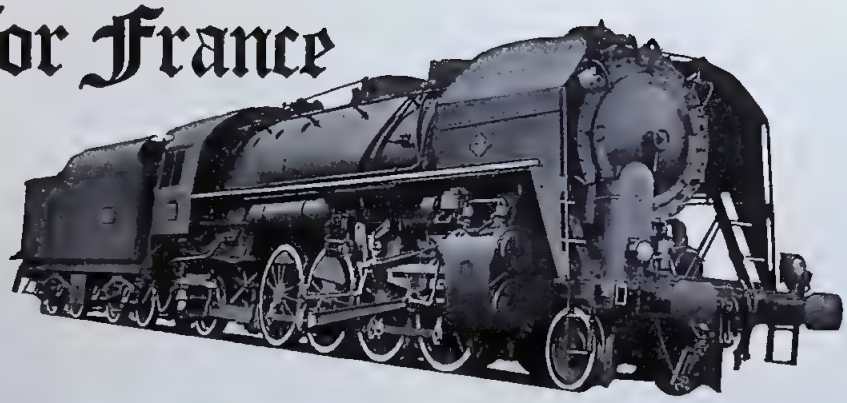

To meet the desperate needs of the French railways, where five out of six locomotives were destroyed during the war, 700 type 2-8-2 steam locomotives have been ordered from America. Lima is building 180 of these, and on July 31 turned over to the French Supply Mission the first locomotive of the 700 ordered.

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

World's First Coal Burning Turbo-Electric Locomotive to be Equipped with TIMKEN BEARINGS

This revolutionary locomotive is a development of the Chesapeake and Ohio Railway, Baldwin Locomotive Works and Westinghouse Electric Company. Using coal as the basic source of energy it produces steam to operate a turbine, which generates electric power to drive the wheels. The locomotive is designed to develop 6,000 H.P. with a potential speed of more than 100 miles per hour under full load. Timken Bearings have been specified for all axles. The initial order is for three locomotives.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

TIMKEN

RAILWAY ROLLER BEARINGS

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Have you ever noticed that whenever two trains pass, freight or passenger, a trainman will signal, with hand or lantern, to the trainman at the rear of the other train?

This is not merely a friendly gesture. Each man makes a careful visual inspection of the other's train while it passes. Then he signals that all is well or that he has spotted some defect.

This is just one phase of a continuous "check and double check" system. All Union Pacific trains are thoroughly inspected before leaving terminal points . . . all station agents check each train as it passes. Even track crews, along the right of way, are alert to spot any sign of trouble.

Thus, Union Pacific trains are checked time and time again as they transport passengers and freight over the Strategic Middle Route, uniting the East with the mid-West and the Pacific Coast.

THE PROGRESSIVE
UNION PACIFIC
RAILROAD

Old Stations

The New York & Greenwood Lake station at Montclair, N. J., is typical of the ornate railroad stations of a half century or more ago. The best new stations are plainly utilitarian, but then the station was an important structure in the community, and tried its best to be imposing. The N&GL, operated by the Erie, has copious suburban service to Montclair, also served by electrified service of the DL&W.

Theodore Gay, 156 Van Buren Ave., Teaneck, N. J.

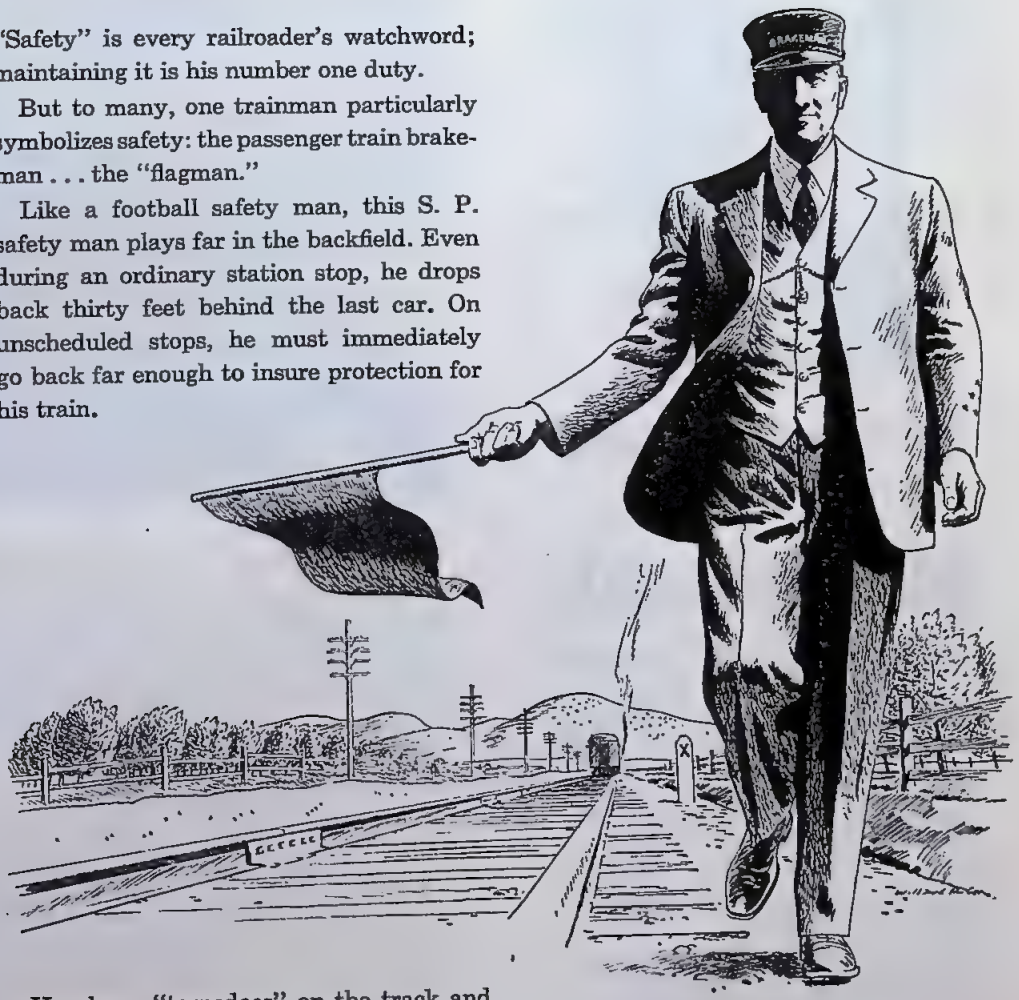
The Laurel Line is a third rail electric road (except at the Wilkes-Barre end where it uses trolley) running frequent service between Scranton, Pittston and Wilkes-Barre. Its proper name is Lackawanna & Wyoming Valley, and it furnishes convenient connections with the Lehigh Valley at one end and the Lackawanna at the other. About six miles from the Scranton end is an old amusement park, and this is Rocky Glen, the station serving it, built to handle the crowds which no doubt once flocked here on special trains.

"SAFETY MAN"

"Safety" is every railroader's watchword; maintaining it is his number one duty.

But to many, one trainman particularly symbolizes safety: the passenger train brakeman . . . the "flagman."

Like a football safety man, this S. P. safety man plays far in the backfield. Even during an ordinary station stop, he drops back thirty feet behind the last car. On unscheduled stops, he must immediately go back far enough to insure protection for his train.



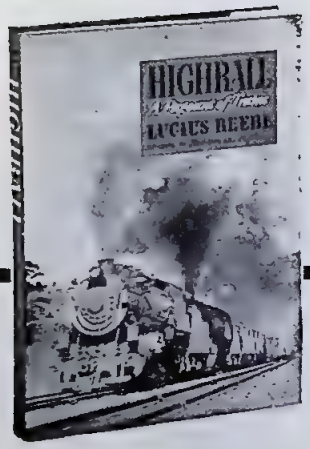
He places "torpedoes" on the track and waits on guard—with flag or lamp—until the train is set to go. When a whistle signal recalls him, he leaves behind a burning "fusee"—a bright red flare that burns for ten minutes (even when wet) to caution following trains.

But all this is just one of our safeguards. There are also amazing mechanical watchdogs (such as automatic block signals, Centralized Traffic Control and Automatic Train Control) and such safety measures as regular track and equipment inspection, physical examination of trainmen, double-checking of train orders, and regular inspection of all trainmen's watches.

With all this backing him up, the brakeman has helped make trains the safest way to travel. You're actually safer on a train than in your own home!

The brakeman is a key man on our Southern Pacific team—one important key man among the thousands of experienced railroaders who guide and guard every train on every mile of its run.

S·P The friendly Southern Pacific



LUCIUS BEEBE

adds another fascinating volume
to his outstanding works on railroading

Highball:

A PAGEANT OF TRAINS

A magnificient companion volume to Mr. Beebe's earlier collections of railroad photographs and legend, HIGH IRON, HIGHLINERS and TRAINS IN TRANSITION. With a rare fusion of wonderful pictures and vivid prose, HIGHBALL brings familiar material up-to-date and ventures into entirely new fields. There are passages dealing with such varied subjects as the motive power of the Santa Fé, the Pennsylvania's famous K4s Class engines, cabooses yesterday and today, the steam locomotives of the great tradition, and—a real collector's item—the whole story of Colorado railroading from the time when the golden spike was stolen as the first rails were laid into Denver right up to today.

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Place your order with your bookseller, or with this magazine, now. The initial printing may not be large enough to supply the heavy demand. $6.00

APPLETON - CENTURY
35 W. 32nd St., New York 1, N. Y.

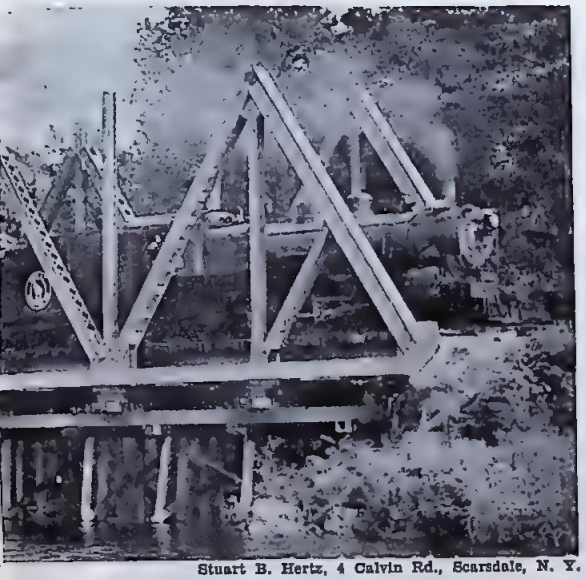
When the Great Northern Railway replaced its bridge over the Skykomish River near Startup, Wash., on the Pacific side of the Cascades, it was done without interrupting service. The weight of the track was transferred to a temporary trestle as the old bridge was removed piecemeal, and the new bridge was built, being literally wrapped around the old track. The westbound Cascadian is shown passing over the partially completed structure last June.

Longest Sleeping Car Run

For many days and how many miles can you ride on sleeping cars? Has that question ever puzzled you, or have you always just made short overnight hops in your Pullman? To save you many hours of studying, we'll tell you that you can board a sleeper in the fine new Montreal Station at 8:20 p.m. on a Sunday evening, for instance, and not move until Thursday morning at 9:20 a.m., by which time you will be in Vancouver, 2928 miles away, and have spent exactly 88 hours in the same car. The entire ride will have been aboard the famous *Continental Limited* of the Canadian National. Now, don't run for the Guide and check the Canadian Pacific, for it has a line approximately 100 miles shorter. And even if you were thinking about a ride from Quebec to Vancouver—even if there was a through car—it strangely is 5.4 miles shorter. You may doubt that though if you look at the map. It would be possible to make an even longer trip if the Canadian National operated through sleepers from Halifax, for the trip would then total 3768 miles, and running time would be 114 hours. By that time you should definitely have ascertained whether or not the porter's name is George.

Mail by Rail

It is estimated that of the 6,270,288,000 pounds of mail handled by the Post Office Department in the year ended June 30, 1945, over 5,800,000,000 pounds, or more than 92 per cent, were handled by the railroads.



Stuart B. Hertz, 4 Calvin Rd., Scarsdale, N. Y.

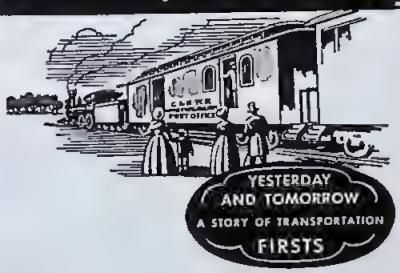
Snow Melter

A snow melter which loads and melts snow as an engine moves it along the rails has been developed by the Boston & Maine Railroad. The snow melter which has proved especially valuable in congested areas consists of three units, an endless belt snow loader, double melting tanks, and, of course, the engine which furnishes both heat and motive power.

As the engine pushes the unit along at a rate of two or three miles an hour, the loader scoops up the snow to a depth of about two inches below the rail. A conveyor carries the snow to the melting chambers which have a 10,000 gallon capacity (13,500 cubic feet).

The smaller, or heating, tank of the melting unit is filled with water. When steam from the locomotive is forced into this tank the valves are opened and both tanks filled to equal levels. As snow is dumped into the melting tank, the water level rises and flows into the heating tank. Only enough steam to keep the snow from piling up is forced into the melting tank. When the melting tank is full, the temperature is held at about 32 degrees F. so no heat is wasted while the tank is being emptied.

"I am going to put the post office on wheels"
George B. Armstrong

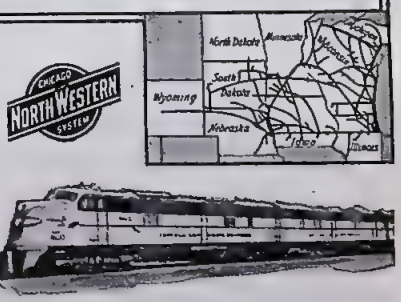


It was 1864. George B. Armstrong of the U. S. Mail Service, with visions of a "postal car" before him, discussed his plan with officials of the "North Western." These far-seeing men saw its possibilities, and on August 28th, 81 years ago, a rebuilt baggage car made the initial "post office" run between Chicago and Clinton, Iowa.

The postal car quickly proved its value. Three years later "North Western" designed five cars for railway post office service, *the first in America built expressly for this purpose.*

The novelty of the railway mail car has gone but its utility lives on. A traveling post office, speeding through the night with thousands of pieces of mail matter to be sorted and ready for distribution in far distant communities, still is a vital link in Uncle Sam's mail service.

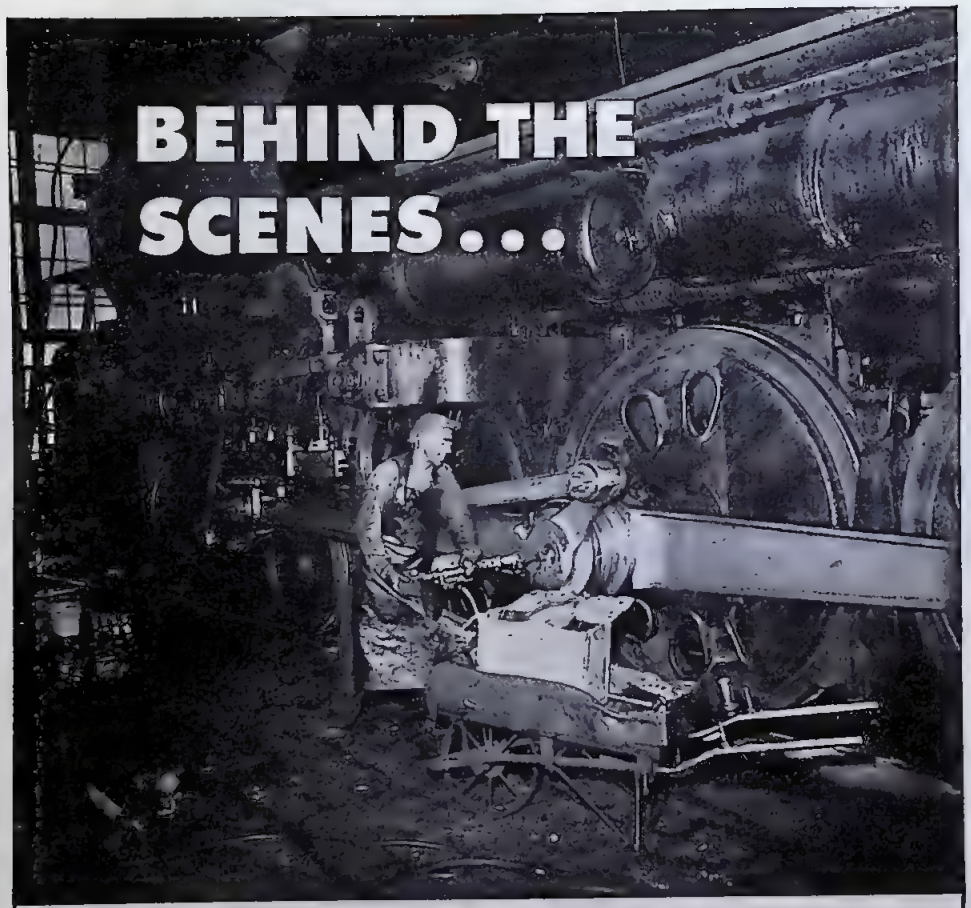
Armstrong, the Father of the Railway Post Office, performed an outstanding service —"North Western" is proud of its part in making his dream come true.



Since the days of the Old "Pioneer," in 1848, "North Western" has kept pace with the needs of the communities it serves. Our constant aim is to serve our customers better. We thank all of you, travelers and shippers, for your patience during the war years and assure you that in the future as in the past "North Western" will continue to offer you *the finest in transportation service.*

CHICAGO and NORTH WESTERN SYSTEM

SERVING AMERICA IN WAR AND PEACE FOR ALMOST A CENTURY



This Frisco "lubricating man," using a power operated air gun, is shown forcing hard grease into the center of the main pin, which lubricates the bearings to the main rod and middle connection. This operation is performed before each trip and at principal intermediate terminals.

It's the thousand and one things behind the scenes that make the great Frisco organization function so smoothly in its freight and passenger service.

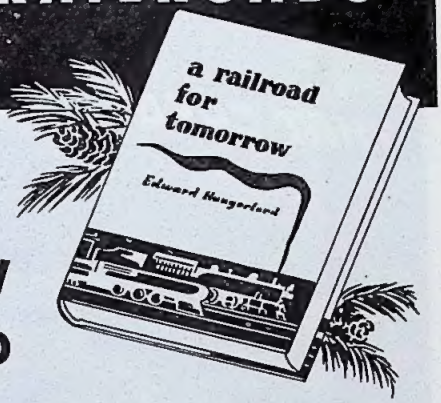
The job of this lubricating man in the shops, for instance, is as much a part of the whole scheme as is that of the engineer in the cab of this great locomotive. He's doing more than make a train run smoothly—he's helping to make a great railroad, serving nine important states, run smoothly.

FRISCO LINES

ST. LOUIS-SAN FRANCISCO R.Y.

It's a Great Railroad

WHAT WILL OUR RAILROADS BE LIKE IN 1960?



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In colorful, detailed description, America's foremost railroad writer takes you 15 years into the future . . . to travel over and examine the railroad network as remodeled into a national federation of regional, privately-owned companies. Ride over the super-railroad short line across Pennsylvania; enjoy the "1960 model" electric coaches on the main line from New York to Cleveland; study the plans for new terminals as built in New York, Chicago, San Francisco, St. Louis, Boston and other cities. The 380 pages of text and 32 pages of illustrations and 2-color maps are described by Col. William J. Wilgus (in charge of engineering for N.Y.C.) as ". . . marvelous work . . . remarkable grasp of subject . . ."

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Railroads played a major part in their comings and goings. Trains carried almost all of them—many of them time after time. More than a million a month are riding the trains right now. And trains successfully handled the even bigger job of carrying nine-tenths of the mountains of material which they needed to win the war.

The end of the war means many things to many people. One thing it means to the railroads is a chance to get long-denied material for building new locomotives, new freight cars to replace equipment worn by war service—and fine, new passenger trains to provide added comfort and luxury in swift, safe travel.

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LET'S FINISH THE JOB
BUY VICTORY BONDS

AMERICAN RAILROADS
—LOOKING AHEAD

Correspondence

In the August TRAINS [page 10] Porter, Ind. is mentioned as a railfan's paradise with trains of the MC, NYC, Pere Marquette, and EJ&E on parade. About 25 miles down the EJ&E main line lies a still more crowded little town, Griffith, Ind., which boasts of the EJ&E, MC, GTW, C&O and Erie, not only passing through but also meeting at a central interlocking plant. Of all the roads named only the MC is a branch, the rest of them main lines with the EJ&E throwing in its Gary branch junction to boot. Nor is this all. From the tower you can see two more roads, the Pennsy's Logansport Division and an NYC branch line, this time forming a four way meet with the MC and EJ&E.

Cpl. Lee Hinchliffe, 598 Air Engineers, China.

We have a piece in December "Popular Photography" wherein we tell all on the subject of railroad photography - or practically. We reserve as a state secret the method of applying Texas & Pacific smoke on smokeless Pennsy trains going through cities with strict smoke abatement regulations. Only the atom bomb causes greater terror in operating departments than our pictures.

Lucius Beebe, New York, N. Y.

Ever hear of a bridge which strengthened itself with the passing years? P. M. Donnellan, superintendent of the Erie's Susquehanna and Tioga Divisions, is authority for the statement that the famous Starrucca Viaduct has done just that. The famous arches were built in 1845 of dry stone construction. Only a single small engine was permitted to cross at a time. Later the bridge was double tracked and two such engines could use the structure at once. Today, after a century, the Erie's heaviest power, including the class S Berkshires, roll over the old stonework. Each regular inspection finds the arches standing strong and the safety rating of the viaduct has actually been increased through the years.

William C. Kessel, 24 W. Cleveland Dr., Buffalo, N. Y.

In Bethlehem, Pa., we saw a rare combination, a Reading passenger train all made up and waiting in the station—with a cattle car on the rear end.

North Jersey Midland Model Railroad Association, Irvington, N. J.

The Reading has issued a new rulebook to all employees. Among one of the most interesting and probably the most important change, or revision, taking place, is the putting of the railroad on an entirely east and west basis. In the past, the various lines of the Reading were designated as "east and west" or "north and south," depending upon the directions they ran. For some reason or other, the train numbers were mixed up also. The main line from Philadelphia to Reading and Pottsville was north and south, as was the Bethlehem Branch, yet the numbers of trains that used any or all of these lines were even numbers for southbound and uneven numbers for northbound, directly opposite from standard railroad practice. Now, however, with the new revised rulebook, the main line is east and west instead of north and south, as is the Bethlehem Branch, and train numbers conform to standard practice as far as direction and even and uneven numbers are concerned. Even with this change, there is a bit of humor to be seen. The Bethlehem Branch, the Wilmington & Northern Branch, and the line from Reading to Slatington are three outstanding examples on the system of directly north and south lines, geographically speaking, yet under the new plan they are east and west.

Bert Pennypacker, Box 341, Coatesville, Pa.

Running Extra

Meet Tony . . .

Sure, we know. Last month we promised to run some individual pictures of the receptionists appearing in this column in the October issue. And we will. But first we thought you'd like to meet Tony Dentice. He is the fellow who keeps things in apple-pie order around our offices and printing plant. After work, during the summer, you'll find him on his boat, a rebuilt Coastguard craft, which Tony often takes several miles out while fishing for Lake Michigan whitefish.

Next month, glory be, TRAINS will be back to a heavy enamel paper cover. All restrictions on subscriptions have already been removed, and copies will be on sale at most newsstands again by December. Tell those friends who have been borrowing your TRAINS that it is no longer patriotic to read over your shoulder and now they ought to get their own copies. Thus they can have for keeps such treats as the color prints coming in December and the special photographic section beginning in January.

Here's a tip for those who want to get the best in railroad photography. It comes from Peter Helck, one of the leading artists in the commercial illustrating field. He applies it for many settings but points out in particular that: "If you want to learn what differentiates cinders from steel, smoke from sky, trains from buildings, etc., in a rail yard, stand on your head. You may look like a dope but it is amazing what this will do toward making you see the thing in abstract. You will discover what makes form and texture." While Helck suggests the principle of inverted view especially to those who paint, we tried it when taking photos. You may think that you have a perfect photographic composition lined up in your finder. Before you snap the shutter, look the same scene over by inverting your head until you see it upside down and unframed. Then walk a few feet away, and after a few tries you'll want to change the tripod, the distance and the entire setting.

Kalmbach Publishing Co.
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"Sometimes I feel just like Superman!"

"YEP, sometimes I do feel just exactly like Superman!

"Sitting here at the control panel of this Burlington Centralized Traffic Control system, I'm just about the biggest traffic cop you ever saw.

"Dozens of trains, on miles and miles of track, start and stop when I flip these little levers. They open and close switches all along the line, and give the train crews their instructions by means of traffic lights. CTC shows me the location of every train on my stretch of track every minute of the day and night. Yes sir, CTC safeguards trains loaded with millions of dollars' worth of food and clothing and machinery . . . and with priceless human lives, too.

"Passengers and freight customers get a lot of good out of Burlington Centralized Traffic Control. They get a lot more speed and efficiency—better service on every train. You can see that.

"You can see, too, why I might feel like Superman. But then I remember—I don't really do all this . . . CTC does! So if anyone on the Burlington is Superman . . . brother, it's CTC!"

• • •

CONTROL is the keynote of modern railroading. That's why the Burlington has always been one of the world's leaders in CTC . . . why the Burlington has already invested more than $2,500,000 in CTC . . . why this railroad will continue to invest more and more in this modern tool for better railroading.

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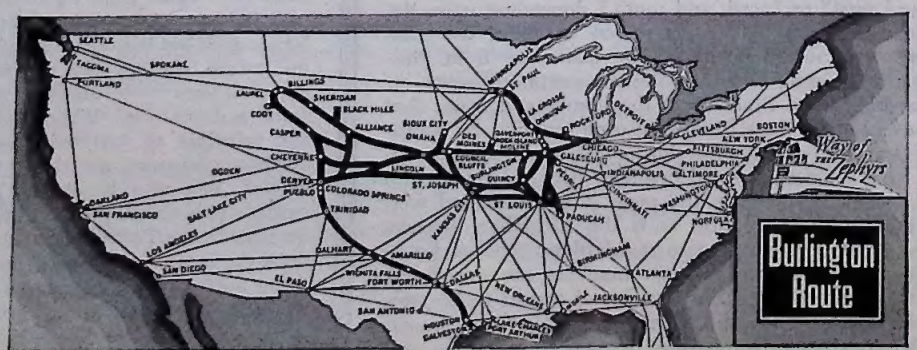

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